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THE REACTION OF DENTAL PULPS TO SILICATE CEMENTS

H. A. Zander,* M.S., D.D.S., Boston

When the average dental practitioner is faced with the necessity of restoring anterior teeth, his choice of filling materials is often limited by the dictates of esthetics and economics. Because of these limitations it is not uncommon for him to use silicate cements. More than 11,000,000 such restorations are placed each year.[1]

The physical properties of silicate cements have been studied in great detail at the National Bureau of Standards and by various dental manufacturers. The researches have led to the formulation of specifications governing the physical properties of these materials. Unfortunately this detailed information is not matched by a comparable amount of knowledge as to the effect of silicate cements on the dental tissues. This is particularly true of the dental pulp, for there is clinical evidence which suggests that silicate cements produce undesirable pulpal reactions. Some investigators[2-4] have postulated that the acidity of silicate cements is responsible for these harmful effects. On the other hand, millions of silicate restorations are successful and cause no apparent harm to the pulp.

The researches of Pallazzi,[5] Fasoli,[6] Manley[7] and Gurley and Van Huysen,[8] which were carried out on dogs, support the belief that silicate cements cause

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*Assistant professor of clinical dentistry, Tufts College Dental School.

1. Garrett, W. E.: Silicate Cements. J.A.D.A. 29:960, June 1, 1942.

2. Webb, W. R., Jr.: Comparative Value of the Porcelain Inlay. D. Items Interest 44: 890, December 1922.

3. Doubleday, F. N.: Silicate Cement Filling. Brit. D. J. 47:493, May 1, 1926.

4. Harvey, Warren; Le Brocq, L. F., and Rakowski, L.: Acidity of Dental Cements. Brit. D. J. 77:61, August 4, 1944.

5. Pallazzi, S.: Einige Konklusionen aus meinen dreijahrigen. Experimenten über die Veranderungen der Zahnpulpanach Füllungen mit Silikatzementen. Ztschr. f. Stomatol. 22: 238, April 1924.

6. Fasoli, G.: Silikatzemente und Pulpaveränderungen. Ztschr. f. Stomatol. 22:225, April 1924.

7. Manley, E. B.: Preliminary Investigation into the Reaction of the Pulp to Various Filling Materials. Brit. D. J. 60:321, April 1, 1936.

8. Gurley, W. B., and Van Huysen, Grant: Histologic Changes in Teeth Due to Plastic Filling Materials. J.A.D.A. 24:1806, November 1937.

severe pulpal reactions. Manley[9] has demonstrated that similar reactions occur in human teeth. His method of approach was to insert silicate fillings in children's teeth, extract the teeth after two weeks and study them by histologic methods. He observed degeneration and destruction of odontoblasts with round cell infiltration of the pulp and attributed these changes to the irritating effects of the filling material. Manley, like Gurley and Van Huysen, found no pulpal reaction in teeth filled with zinc oxide-eugenol cement. Barker[10] studied decalcified sections of human teeth filled with silicate cement for various lengths of time. While he found some evidence of pulpal injury, he concluded that it was not sufficiently severe to cause pulpal death.

These reports offer a considerable body of opinion suggesting that silicate cements are harmful to the pulp. However, most of this opinion is based on animal experiments or uncontrolled clinical observations. It must be emphasized that all of the studies described above have been carried out on sound teeth. Since in clinical practice only teeth with caries or erosion are restored, the need exists for a correlation of controlled clinical and laboratory experimentation that will cast light on the reactions under conditions resembling more closely those under which these materials are used in dental practice. Therefore this study was designed to show: (1) the pulp reaction to silicate cements placed in cavities cut in sound teeth; (2) the pulp reaction to silicate cements placed in cavities prepared in carious or eroded teeth; (3) the incidence of pulp death under silicate cement restorations.

9. Manley, E. B.: Investigations into the Early Effects of Various Filling Materials on the Human Pulp. D. Record 62:1, January 1942.

10. Barker, J. N.: Reactions of the Pulp to Various Filling Materials and Clinical Procedures. Austral. J. Den. 46:226, December 1942.

Histopathologic Studies

Thirty human teeth, free from caries and erosion and scheduled for extraction for prosthetic reasons, were studied in the first part of this investigation. The patients included in the study were from 19 to 55 years of age. Cavities were prepared on the labial surface in the gingival third of the anterior teeth. Every effort was made to control traumatic and thermal factors. Most of the cavities were filled with silicate cement, but to provide a control some were filled with zinc oxide-eugenol cement. This material has been demonstrated in our own[11] and other laboratories[7-9] to have no harmful effect on the pulp. A limited number of teeth with no cavities were also utilized for control purposes.

The depth of the cavities was varied in order to examine the effect of silicate cement placed at various distances from the pulp. The teeth were extracted at intervals varying from one to fifteen weeks after cavity preparation and filling. In this manner it was hoped to secure some evidence as to the rapidity and the duration of the reaction.

To study the pulp reaction in human teeth with caries or erosion, fourteen such teeth were filled with silicate cements. These teeth were extracted at intervals ranging from five weeks to several years after cavity preparation and filling.

After extraction, all teeth from both groups were ground to thin plates under water with diamond stones, fixed in Zenker formol, decalcified in nitric acid, embedded in celloidin, sectioned, and stained with hematoxylin and eosin.

More detailed information about the teeth used is presented in Table 1. It shows the age of the patients whose sound teeth were used and the type of teeth which were used for experimental and control purposes. It also gives information as to the length of time that the fillings were in position and records the

11. Zander, H. A.: To be published.

Table 1.—Summary of experimental procedures

Patient Number	Tooth Number	Age of Patient	Teeth Used for Cavity Preparation	Teeth Filled with Silicate Cements	Teeth Filled with ZOE*	Control Teeth	Number of Weeks Filled	Deep Cavities	Shallow Cavities
1	1-4	55	UR 1	UR 1					
			UL 1, 2	UL 1	UL 2	UL 3	15	all	.....
2	5-9	48	LR 2, 3, 4	LR 3, 4					
			LL 3	LL 3	LR 2	LL 2	6	all	.....
3	10-15	39	UR 1, 3	UR 1, 3				UR 1, 3	UL 1
			UL 1, 2, 3	UL 1, 2, 3	.....	UR 2	11	UL 2, 3	
4	16-19	55	LR 1, 2	LR 1, 2					LR 1, 2
			LL 1, 3	LL 1, 3	.....	.....	6	LL 3	LL 1
5	20-24	42	UR 3	UR 3					
			UL 3	UL 3				UL 3	UR 3
			LR 2, 3	LR 2, 3				LR 3	LR 2
			LL 1	LL 1	.....	.....	8		LL 1
6	25-28	35	UR 3, 4	UR 3, 4				UR 3, 4	
			UL 3, 4	UL 3, 4	.....	.....	5	UL 3	UL 4
7	29-30	19	UR 3	UR 3					
			LR 3	LR 3	.....	.....	1	all	.....

*Zinc oxide-eugenol cement.

approximate depth of the cavities.

The silicate cements for this study were purchased on the open market. The two most widely used brands were selected. Because early results indicated a comparable response to both, no attempt was made to differentiate between the two brands.

A. Sound Human Teeth

Patient 1, aged 55.

Teeth 1-2.—These teeth were filled with silicate cement for fifteen weeks. The cavities extend through one-half of the dentin. The odontoblasts adjacent to the tubules leading from the cavity to the pulp are degenerated or entirely missing. The connective tissue is markedly infiltrated with round cells. These cells consist of lymphocytes and plasma cells. In this area dentin resorption can be observed.

Tooth 3.—This tooth was filled with zinc oxide-eugenol cement for fifteen weeks. The cavity has the same depth as those in teeth 1 and 2, which were filled with silicate cement. The odontoblastic layer is intact. No round cell infiltration is present. The pulp is normal.

Tooth 4.—This control tooth, without cavity or filling, has a normal pulp.

Patient 2, aged 48.

Teeth 5-7.—These teeth were filled with silicate cement for six weeks. The cavities extend through three-fourths of the dentin. The odontoblasts adjacent to the injured dentin tubules in contact with the silicate filling are completely destroyed. There is dense round cell infiltration, consisting mostly of polymorphonuclear leukocytes, a few plasma cells, lymphocytes and monocytes. Figures 1, left, and 2 are photomicrographs of tooth 7. The zone of cellular infiltration is directly related to the cavity outline. The rest of the pulp is normal, except that it is slightly edematous.

Tooth 8.—This tooth was filled with zinc oxide-eugenol cement for six weeks. The depth of the cavity is the same as, or greater than, the depth of the cavities in teeth 5-7, which were filled with silicate cement. The odontoblastic layer is undisturbed. The pulp is normal. (Fig. 1, right.)

Tooth 9.—This control tooth, without cavity or filling, has a normal pulp.

Patient 3, aged 39.

Tooth 10.—This tooth was filled with sili-

Fig. 1.—Left: Lower left cuspid of patient 2: (A) cavity; (B) dentin; (C) pulp inflammation. This was a sound tooth filled with silicate cement for six weeks before extraction. Inflammatory reaction is present adjacent to the dentin tubules leading to the cavity floor and wall. Right: Lower right lateral incisor of patient 2: (A) cavity; (B) dentin; (C) uncalcified dentin; (D) pulp. This was a sound tooth filled with zinc oxide-eugenol cement for six weeks before extraction. The pulp is normal

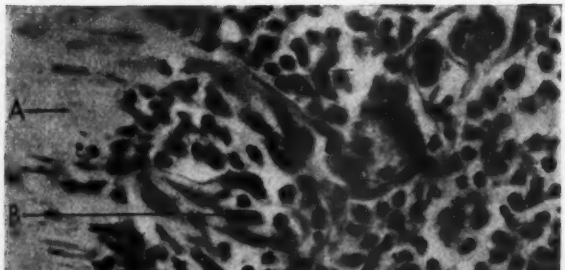

Fig. 2.—High magnification of pulp inflammation in Figure 1, left: (A) uncalcified dentin; (B) fibroblast; (C) leukocyte

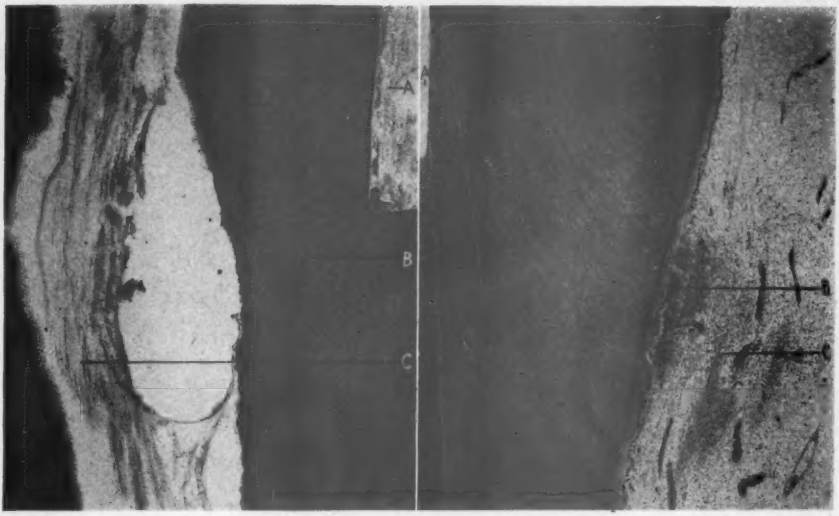

Fig. 3.—Left: Upper right cuspid of patient 3: (A) cavity; (B) dentin; (C) necrotic pulp. This was a sound tooth filled with silicate cement for eleven weeks before extraction. The pulp is necrotic. Right: Upper left cuspid of patient 3: (A) cavity; (B, C) pulp inflammation. This was a sound tooth filled with silicate cement for eleven weeks before extraction. The pulp inflammation is adjacent to the dentin tubules which are connected with the cavity

cate cement for eleven weeks. The cavity extends through three-fourths of the dentin. The patient had complained of a dull ache in this tooth during the last four weeks of the experiment. The pulp tissue is necrotic. (Fig. 3, left.)

Teeth 11-13.—These teeth were filled with silicate cement for eleven weeks. The cavities are almost as deep as in tooth 10. The odontoblasts adjacent to the tubules leading to the cavities are destroyed. Cellular infiltration and abscess formation are present. (Fig. 3, right.) Polymorphonuclear leukocytes, mononuclear wandering cells and plasma cells are present. (Fig. 4.)

Tooth 14.—The shallow cavity was filled with silicate cement for eleven weeks. Slight degeneration of the odontoblasts and slight cellular infiltration are present.

Tooth 15.—This control tooth has a normal pulp.

Patient 4, aged 55.

Teeth 16-18.—The shallow cavities were filled with silicate cement for six weeks. The odontoblastic layer is undisturbed. The pulp is normal.

Tooth 19.—This tooth was filled with silicate cement for six weeks. The cavity extends through one-half of the dentin. The odontoblasts in the region corresponding to the cavity are destroyed. Hyperemia, hemorrhage and round cell infiltration are noted.

Patient 5, aged 42.

Teeth 20-21.—These teeth were filled with silicate cement for eight weeks. The cavities extend through one-third of the dentin. Degeneration of the odontoblasts adjacent to dentin tubules which connect pulp and cavity, together with slight round cell infiltration, is evident.

Teeth 22-24.—These very shallow cavities were filled with silicate cement for eight weeks. No inflammation is present, and the pulp is normal.

Patient 6, aged 35.

Teeth 25-27.—These teeth were filled with silicate cement for five weeks. The cavities extend through one-third of the dentin. Degeneration of the odontoblasts and slight round cell infiltration of the pulp area corresponding to the cavities are present.

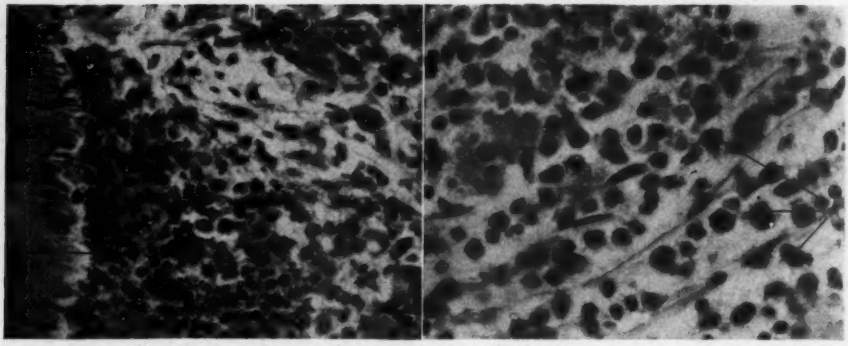

Fig. 4.—High magnification of pulp inflammation in Figure 3, right: Left: Area close to dentin: (A) uncalcified dentin; (B) leukocytes. Right: Area outside of hemorrhage: (A) mononuclear wandering cells

Tooth 28.—This shallow cavity was filled with silicate cement for five weeks. The pulp is normal.

Patient 7, aged 19.

Teeth 29-30.—The cavities, which extend through two-thirds of the dentin, were filled with silicate cement for one week. Degeneration of the odontoblasts adjacent to the injured dentin, together with acute inflammation of the pulp and round cell infiltration, is noted. An abscess is located in the area adjacent to the tubules leading to the cavities.

B. Human Teeth with Caries or Erosion

Teeth 31-32.—These teeth presented wedge-shaped erosion lesions. They were filled with silicate cement for six weeks. Cavities extend through the entire thickness of the dentin into the irregular dentin. (Fig. 5, left.) The irregular dentin layers do not conform to the cavity outline. There are no signs of an inflammatory reaction in the pulp.

Tooth 33.—This tooth presented a small area of caries in the gingival third. The tooth was filled with silicate cement for five weeks. The cavity extends through one-half of the dentin into part of the carious area and also into sound dentin. (Fig. 5, right.) There is an area of irregular dentin corresponding to the caries. The pulp in this area is normal. The pulp adjacent to the tubules which are not affected by caries but which are in contact with the silicate cement filling shows areas of hemorrhage and round cell infiltration. (Fig. 6, left.)

Teeth 34-42.—These were carious teeth which had been filled with silicate cement for more than three years. All pulps show irregular dentin formation, with walling off of tubules leading to the cavities filled with silicate cement. All pulps are within normal variations. Figure 6, right, is a photomicrograph of an upper left cuspid which had mesial and distal fillings for ten years. During this time the fillings had either "washed or fallen out" several times and had been replaced. The last filling was inserted one year before extraction of the tooth. Several layers of irregular dentin are walling off the mesial and distal cavities from the pulp. The pulp appears normal for a person 39 years old.

Teeth 43-44.—These teeth were filled with silicate cement for approximately one year. They were extracted because the patient complained of dull aches which had started several weeks after the teeth had been filled. Only a slight amount of irregular dentin is present. The pulp is necrotic.

Clinical Studies

In order to study the incidence of pulp death under silicate cement restorations placed as part of routine dental treatment, records were compiled on 211 teeth which had been restored with this material. In each instance the patient's age,

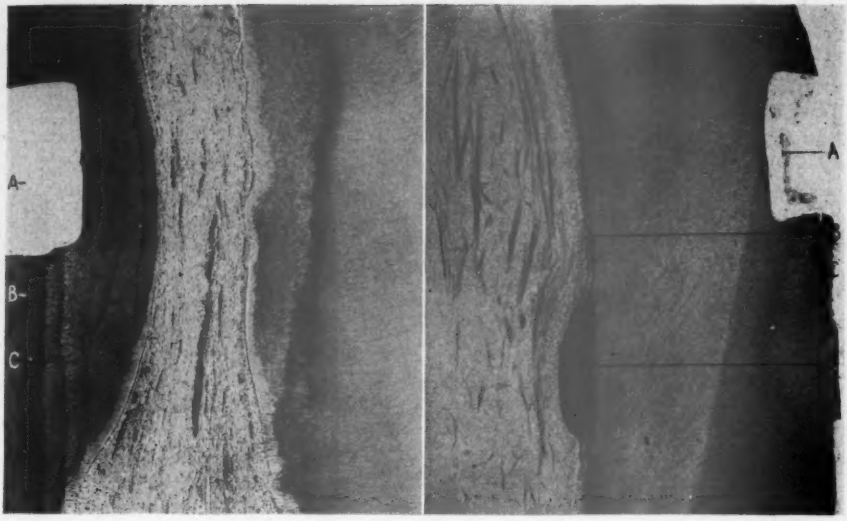

Fig. 5.—Left: Tooth 31, a lower right central incisor with erosion lesion: (A) cavity; (B) dentin; (C) irregular dentin. The cavity in the erosion area was filled with silicate cement for six weeks before tooth extraction. The pulp is normal. Right: Tooth 33, an upper right cuspid, with caries in the gingival third: (A) cavity; (B) pulp inflammation; (C) caries; (D) irregular dentin. The cavity, extending into carious and sound dentin, was filled with silicate cement for five weeks. There is inflammatory reaction adjacent to the dentin tubules leading to that part of the cavity which was cut into sound dentin. There is no inflammation adjacent to the area of irregular dentin which was formed as a response to caries

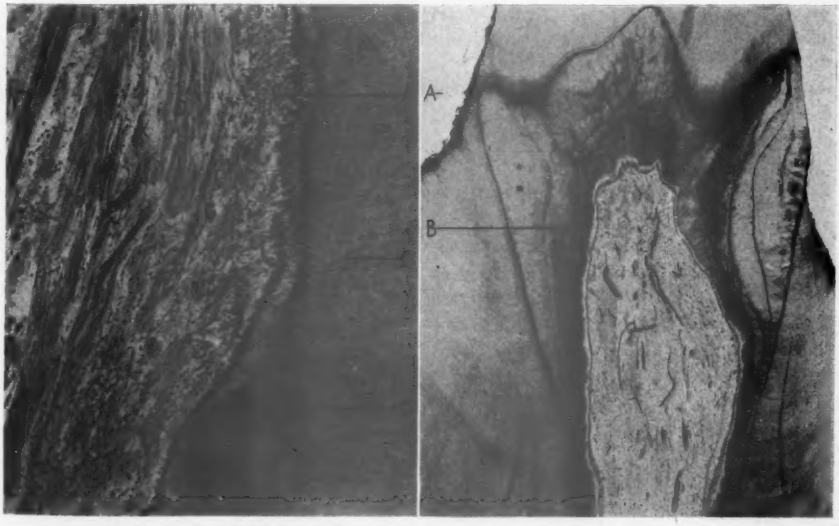

Fig 6.—Left: High magnification of area of pulp inflammation in Figure 5, right: (A) area of hemorrhage and round cell infiltration; (B) dentin; (C) irregular dentin. Right: Tooth 42, an upper left cuspid, with mesial and distal cavities filled with silicate cement for ten years: (A) cavity; (B) irregular dentin. The pulp is normal

the length of time that the fillings had been in the tooth, the approximate size of the filling and the reaction of the pulp to the electric pulp tester were noted. The pulp tester used in this investigation is graded arbitrarily from 1-14 as to the amount of current needed to elicit a response. The majority of patients used in this study were dental students. It was found desirable to use them rather than clinic patients because data obtained from students in regard to the age of the filling and the response to the pulp tester were more accurate.

In the determination of pulp reaction, the importance of gingival response was evaluated by a preliminary test on the gingival tissues and on sound teeth. The patient was always able to distinguish between the response of the gingivae and the test of the tooth. Thus the threshold of irritability of a normal pulp was established in each patient. Sound anterior teeth responded between 2 and 5, but always within the range of 1 in the same patient. Next the teeth with silicate cement restorations were tested and the current reading recorded. If the current reading of the tooth filled with silicate cement was more than two intervals greater than the reading of the control tooth, it was felt that the reading was indicative of pulpal disease. If no response was given at 14 on the scale, the tooth was declared nonvital.

Table 2 shows the relation of the patient's age, the size of the filling and the age of the restoration to the number of teeth found to be nonvital or to have a lowered vitality. This table indicates that the largest number of nonvital teeth are in the youngest age group.

The relation of approximate size of filling to the number of nonvital teeth, or to teeth with an increased threshold of irritability, is graphically presented in Figure 7. Table 2 reveals that no teeth with small restorations were nonvital and that in the medium-sized group only

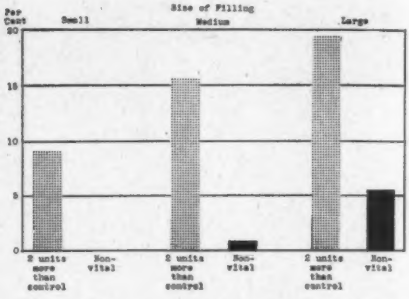

Fig. 7.—Relation of approximate size of filling to the number of nonvital teeth or to teeth with an increased threshold of irritability

0.9 per cent were nonvital. This is in contrast to the finding that 5.6 per cent of the teeth with large silicate cement fillings were nonvital. The same trend is indicated in the column in Figure 7 representing teeth with a higher threshold of irritability. From these statistics it is apparent that the larger the filling the greater the incidence of injury to the pulp.

Regarding the relation of the length of time that the filling had been in the tooth to the number of nonvital and "increased threshold" teeth, Table 2 shows that, in the thirty-five teeth which had been filled with silicate cement for less than three months, three were nonvital and eight had a higher threshold of irritability. None of the 126 teeth restored with silicate cement for more than three years was found to be nonvital. These figures clearly indicate that, if a pulp dies under a silicate cement filling, it most probably does so within the first three months. Thus it is probable that the percentages of pulps dying under silicate cement fillings included in this table are on the low side. This is so because the table obviously does not include those teeth which, having shown reactions soon after being filled with silicate cement, were extracted or received root canal fillings.

Of the 211 teeth tested in the study,

Table 2.—Relation of patient's age, size of filling and age of restoration to pulpal response of 211 teeth filled with silicate cement

Pulpal Response	Age of Patient			Size of Filling			Age of Restoration			
	Under 19 Years	20-26 Years	27 Years or More	Small	Medium	Large	Less Than 3 Months	3 Months to 1 Year	1 Year to 3 Years	3 Years or More
Same as control*	43	112	17	30	89	53	24	21	19	108
2 units or more higher than control†	9	17	8	3	17	14	8	5	3	18
Nonvital‡	3	1	1	..	1	4	3	1	1	...

*Indicates that the reaction of the tooth to the pulp tester is the same as the reaction of the control teeth.

†Indicates that the reaction of the tooth to the pulp tester is at a higher threshold than is the reaction of the control teeth, but that the tooth is not nonvital.

‡Indicates no reaction to the pulp tester at 14, the end of the scale.

five, or 2.3 per cent, were found nonvital and thirty-four, or 16.1 per cent, had a higher threshold of irritability than the control teeth.

Comments

It is obvious from the experiments described above that silicate cements exert a harmful effect on the dental pulp. This is amply demonstrated in Figures 1, left, and 3. That this damage must be attributed to the irritating qualities of silicate cement and not to the operative procedures of cavity preparation is apparent because comparable cavities filled with zinc oxide-eugenol cement showed no pulpal damage.

Despite differences in the severity, the nature of the pulpal reaction was comparable in all sound teeth. The odontoblastic layer which corresponds to the tubules in contact with the cavity shows degeneration in most instances. Cellular infiltration ranging in severity from a mild reaction to abscess formation or pulp necrosis was a consistent finding. The picture of inflammation depends to some extent on the length of time that the silicate cement fillings had been in position. Polymorphonuclear leukocytes are numerous in the pulps of the teeth from patients 2, 3 and 7. In all other cases, monocytes and plasma cells dominate the picture. The pulp presents a nonspecific acute to chronic type of inflammation. The question arises as to whether this inflammation will result in local destruction and finally total death of the pulp or cause proliferative changes. Irregular dentin may finally wall off the irritating agent or the inflammation may subside if the irritating agent disappears. In one of the cases (Fig. 3, left), necrosis resulted after eleven weeks. Teeth 29 and 30 undoubtedly would have followed the same course except for termination of the experiment. Likewise it seems probable from the histologic picture that a similar prognosis would apply to several other teeth. However, in those cases in which cavities were not too deep, numerous fibroblasts can be seen and it seems possible that the pulps may have survived. In spite of this possibility, one can safely conclude that the silicate cements are a powerful irritant to the pulps of sound teeth.

It is interesting to note that the histologic study supports the belief that there is an individual difference in the severity of the reaction experienced by the patients used in this study. The most

severe reaction observed occurred in the youngest subjects, while the mildest reaction was in the oldest subject. This finding was substantiated in the clinical study in which the youngest group showed the greatest number of nonvital teeth (Table 2).

Two findings are of importance to practicing dentists. One is that the deep cavities prepared in sound teeth and filled with silicate cement gave the most violent pulp reactions. The other is that only mild reactions occurred when a wide layer of dentin was present between the filling and the pulp. While in actual dental practice cavities are seldom extended deeply in sound dentin as in this experiment, nevertheless it is necessary to extend the preparation into noncarious areas. On the basis of the findings described above, it follows that extension for prevention or retention should be practiced with caution and that such extensions into sound dentin should be as shallow as possible. The clinical part of this study bears out this contention, since the teeth with small silicate cement restorations were vital while 5.6 per cent of all teeth with large fillings were nonvital.

The explanation of the fact that some pulps are severely injured or die under silicate cement restorations while at other times they are unharmed may be found in the histopathologic studies of teeth with caries or erosion. In teeth with caries or erosion the pulp has had time to build a protective layer of irregular dentin which apparently cannot be penetrated by the irritant factor associated with the silicate cements (Figs. 5, left, and 6, right). This is true even in the deep cavities. On the other hand, in the investigation of sound teeth the pulps did not respond with irregular dentin formation. The absence of such dentin was a most conspicuous finding. If a cavity is prepared in a noncarious tooth and an amalgam, foil or gold inlay is placed, irregular dentin is normally deposited within a few weeks. This deposition probably does not occur after the insertion of a silicate cement restoration. It follows logically that only those silicate cement restorations which do not necessitate cutting into a large number of sound dentin tubules are without possible harm to the pulp. This is clearly demonstrated in Figures 5, right, and 6, left, which show no reaction in the pulp adjacent to the irregular dentin stimulated by the carious process but which show definite inflammatory reaction opposite sound dentin tubules that are in contact with the silicate cement filling.

The importance of the irregular dentin response in protecting the pulp is further demonstrated in the clinical studies. It was shown that the teeth which remained vital with large restorations were those which initially had either extensive caries or erosion and therefore correspondingly large areas of irregular dentin. The other vital teeth seemed to be those in which the extension of the cavity preparation into sound dentin was shallow. In both instances the irritative effect of the silicate material would be negligible.

Summary

Reports of severe pulp damage due to silicate cement restorations conflict with the fact that millions of human teeth contain such restorations without apparent ill effects. To clarify this discrepancy, histopathologic and clinical studies were made.

Cavities prepared in thirty sound teeth and fourteen teeth with caries or erosion were filled with silicate cements. After varying lengths of time, these teeth were extracted and prepared for histologic study.

Two hundred and eleven teeth filled with silicate cements were tested with the electric pulp tester. The results which were obtained were correlated with the patient's age, the length of time that the

filling was in the tooth and the size of the filling.

From the laboratory and clinical studies, the following conclusions were drawn:

1. Silicate cement is highly irritating to the pulp.

2. Irregular dentin formation or a wide layer of primary dentin tends to minimize this irritation.

3. The pulps of younger persons are more likely to react severely to silicate cements than are the teeth of older persons.

On the basis of these findings, the following procedures are suggested for clinical practice:

1. Extension for prevention should be carried out with a minimal dentin penetration.

2. A nonirritating base such as zinc oxide-eugenol cement should be used, especially in young patients.—*416 Huntington Avenue.*

THE USE OF ACRYLIC RESINS IN RESTORATIVE DENTISTRY

Stanley D. Tylman, D.D.S., M.S., B.S., Chicago

A DECADE ago the use of the synthetic resins in dentistry was limited almost entirely to complete denture prosthesis. The usefulness of the synthetic resins has been expanded so that today they are recommended as a material of choice in almost every phase of dental practice. They are used in removable partial dentures and in crown and bridge prosthesis, and more recently they have found wide application in the field of operative dentistry.

Modified forms of the synthetic resins, known as elastomers, which are flexible and resilient in character, have found use in the field of denture prosthesis and also in the construction of obturators and prostheses for other impaired or missing parts of the human body.

This brief presentation will consider the many uses to which the various types of synthetic resins have been put in dentistry, indicating, where possible, the favorable and unfavorable conditions for their use.

There is no single material in dentistry which fulfills all the requirements of utility and esthetics under all oral conditions. Just as the gold inlay, the baked porcelain inlay and the amalgam and silicate cement fillings have their indications and their limitations, so also do the restorations made of the synthetic resins. A disregard of such limitations has placed acrylic restorations in a rather unfavorable light.

The esthetic qualities of the synthetic resins rate them high as a material for use in inlays in the anterior teeth. Even there they may be contraindicated if the process of mastication exerts displacing forces on them. The elasticity and flow of these materials are such that, unless the restoration has a sufficient amount of bulk and is confined within retaining walls, any unusual masticatory stress is likely to cause its failure.

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Gingival third cavities and cavities in the proximal surface of an anterior tooth which do not involve the incisal angle are prime indications for acrylic fillings, since it is possible to place the fillings within confining walls and not have them exposed to forces which would cause them to flow and to be dislodged from the cavity. At the present time it is not wise to use the synthetic resins for the distal or mesio-occlusal types of cavities, or for three-quarter veneer restorations.

The types of cavities, listed in the order of their suitability for restoration with the acrylic inlay, are as follows: (1) Class 5 cavities, which occur in the gingival third area of the labial, buccal or lingual surfaces of the teeth; (2) Class 3 cavities, which occur in the proximal surfaces of the incisors and cuspids and which do not involve the removal and restoration of the incisal angle; (3) Class 4 cavities, which involve the proximal surfaces of the incisors and cuspids and which require the removal and restoration of the incisal angle; (4) Class 1 cavities, which involve pits and fissures and which are usually found in the occlusal surfaces of the bicuspids and molars; (5) Class 2 cavities, which involve the proximal surfaces of bicuspids and molars; these cavities ordinarily necessitate the removal of the marginal ridge and a portion of the occlusal surface of the tooth.

It has been pointed out by those who have used the synthetic resins extensively for filling teeth that one of the essentials for a successful result is to have the maximum amount of material in the completed inlay in order to gain maximum retention. It is claimed that resins may be placed in closer proximity to the pulp than gold alloys because of the lower thermal conductivity of the acrylic resins as compared with the gold alloys.

In cases in which the dovetail principle is employed to increase the retention of an acrylic inlay, care must be exercised to avoid having a narrow isthmus connecting the body of the inlay with the dovetail. Such an isthmus, if narrow and shallow, will eventually be stretched under the forces of mastication.

As with other types of inlays, the finished cavity in which an acrylic inlay is to be placed should have no undercuts, since undercuts preclude an accurate impression, whether taken in wax or other impression materials. Some writers have recommended a cavity preparation with very small undercuts to help hold the inlay in position; this type of preparation they recommend for the Class 5 or gingival third type of cavity. Where two opposite walls are parallel, a sufficient amount of retention can be obtained without resort to undercuts.

Experience has shown that the box-type cavity preparation is much safer to use than the slice preparation when the synthetic resins are employed.

If the amount of remaining tooth structure permits, it is sometimes advisable to augment the retention of a filling by preparing channels or grooves which aid materially in holding the inlay in place. The grooves must be of sufficient size to prevent the ribs of acrylic resin which fit into them from deforming under masticatory stresses. Cavities prepared for acrylic and baked porcelain inlays do not have their enamel margins beveled because neither acrylic resin nor baked porcelain possesses sufficient edge strength to withstand fracture or distortion under stress. It is a well-established principle in operative dentistry that the finished margins of a cavity should leave no unsupported enamel rods since these break away readily under the forces of mastication.

In filling teeth which have a fractured incisal angle or in which both of the incisal angles and the incisal edge are fractured, the dentist has the choice of using either the baked porcelain or the

acrylic inlay. It is advisable to augment the retention of such an inlay by cutting pinholes or grooves at the dentino-enamel junction or by incorporating pins in the filling. These pins extend into holes cut in the tooth; the holes should be so placed and extended to such a depth that the pulp is not endangered.

Acrylic inlays in Class 2 cavities involving the proximal and occlusal surfaces of bicuspids and molars have been observed in teeth for periods of four or five years; yet our laboratory experience and other clinical observations indicate that this type of cavity is least suited for acrylic inlays. Only in those teeth which were completely out of function was this type of filling successfully retained. It is safer to make the two-surface filling of a gold alloy and to place an acrylic veneer on the buccal or labial surface; thus the gold will not be visible to mar the appearance of the restoration. This modified type of filling has proved serviceable over a period of years. The depth of the veneer should be at least 2 mm.

In the case of a pulpless tooth in which one of the proximal surfaces and an incisal angle are missing and in which large areas of the lingual and labial surfaces are involved, a complete veneer crown is usually employed. Such a tooth may also be restored by fitting a dowel of sufficient length and gage into the root canal and permitting it to extend incisally to within 2 or 3 mm. of the incisal edge of the tooth. The missing portion of the tooth is then restored in acrylic resin, which is processed directly to the dowel. After processing, the acrylic inlay is fitted, finished and cemented in the usual manner.

I hesitate to mention the use of synthetic resins placed directly in cavities of the natural teeth. Although several investigators have conducted experiments with direct intra-oral fillings, it has been my experience, using the materials available today and the existing technics, that a satisfactory filling is not obtained by placing the resin directly in the cavity. It may be that in the future a successful technic and material will be developed for the direct filling of teeth with acrylic resins.

Crowns

It is claimed, on the basis of reports emanating from commercial laboratories, that the baked porcelain veneer crown has been largely supplanted by the acrylic veneer restoration. Whether this claim is valid or not, a word of caution is in order at this time. The baked porcelain veneer crown has given satisfactory service for many years under varying conditions of function, esthetics and oral environment. Properly prepared, a porcelain veneer crown in a vital tooth is mechanically efficient and biologically safe. One should hesitate to discard such a restoration for another which has not yet definitely established its permanency and value.

The synthetic resins possess the following desirable qualities in common with baked porcelain: they are good insulating materials against thermal shock, and they can duplicate the opacity or the translucency of the natural teeth.

The disadvantage of using the synthetic resins for inlays, and for crowns in particular, is that, under conditions of stress, the material exhibits qualities of flow which may have serious results. For instance, well-rounded and correctly placed contact points lose their convexities and become flat surfaces in the course of time, resulting in injury to the interproximal gum tissue. This property of flow, while an advantage under certain conditions, may prove harmful, particularly if the flow of the resin breaks the cement union between the restoration and the tooth margin. Baked porcelain does not have this shortcoming. The acrylic resin will absorb a certain percentage of water, as indicated by all

laboratory tests, and this absorption results in a dimensional change in the restoration. These physical phenomena may prove harmful to the restoration unless they are understood and properly controlled.

Nevertheless, there are instances in which the acrylic veneer crown should be considered preferentially. In a very young patient, if an upper central incisor has been fractured or if proximal cavities have reached a stage where a complete coronal restoration must be placed, the pulp chamber is usually large and the pulp might be endangered if a typical shoulder type preparation for a porcelain veneer crown were undertaken. In such instances, an acrylic veneer crown which does not require the removal of all the enamel or the preparation of a gingival shoulder in dentin would be the restoration of choice, even though it is temporary in character.

Another application of acrylic resins in crowns is found in their use as a veneer for the all cast gold crown. Such combination crowns are used either as individual restorations or as bridge retainers and may be employed in either the anterior or posterior regions of the mouth. Their special advantage lies in the fact that, if the patient should eventually wear through the gold incisal protection, the acrylic veneer will not snap out as would a veneer made of baked porcelain.

In cases in which a tooth is rotated from its normal position or in which a tooth laps over the approximating restoration to such a degree that a baked porcelain crown cannot be used, the acrylic crown is also preferred.

Occasionally, in closed-bite cases and in cases in which the teeth are very short incisogingivally, the acrylic crown may serve more satisfactorily than a baked porcelain crown. These, however, are exceptional conditions.

The acrylic resins have a greater impact strength than porcelain, and hence can be successfully used in very thin layers where porcelain could not be used. For example, acrylic resins can be used as a protective measure in the shoulderless type of crown, which is temporary in nature and is used primarily for children. Because they can be applied in a thin veneer, acrylic resins have also been used to make corrective facings for entertainers, movie actors, etc.

Another use of acrylic resins is found in the construction of a complete acrylic crown with a dowel attached. This type of crown is usually employed in the anterior part of the mouth or in cases in which it is impossible or inadvisable to use the complete veneer type of crown. Many other uses for individual modified restorations could be cited.

There is considerable discussion at the present time as to whether the acrylic resins, when used in crowns of various types, are sufficiently resistant to withstand the wear to which they are subjected in the mouth. Some evidence has been submitted to indicate that there is a definite wear of the teeth under function, while other observers are equally certain that no such wear takes place. Whether actual attrition takes place, or whether the loss of cusp height is caused by the displacement of the material as a result of flow, is still a debated question which time and further experiments will be able to answer. It is known that a highly polished acrylic surface scratches easily when exposed to abrasives.

Bridges

Because of its phenomenal acceptance by the dental profession, the acrylic veneer crown was the forerunner of the acrylic fixed bridge. An acrylic bridge, if reinforced with a metallic truss, may render satisfactory service if the span is short and if the force exerted upon the bridge is not excessive. Owing to the nature of the material, an acrylic bridge

can sometimes be placed where a baked porcelain bridge is contraindicated.

Although many acrylic bridges have failed in the past, some have given complete satisfaction and service. In this latter group are those which were placed only after the oral examination had indicated that the conditions were favorable for an acrylic bridge.

The advantages of an acrylic bridge may be listed as follows: (1) It is highly esthetic. The opinion is sometimes expressed that the acrylic resin harmonizes and blends with the natural teeth better than any material at our disposal today. (2) The technic of constructing an acrylic bridge is relatively simple as compared with that required in making a baked porcelain bridge reinforced with a platinum-iridium truss. (3) The time required is much less than that required for other types of bridges, particularly the baked porcelain bridge. (4) The acrylic bridge is relatively inexpensive to make. (5) Reports in the literature and clinical evidence seem to substantiate the belief that acrylic resin, if properly processed, is biologically compatible with the oral tissues. (6) Properly processed methyl methacrylate resin is impermeable to bacteria, although the resin does not inhibit the growth of bacteria. (7) The acrylic bridge is relatively durable. (8) It possesses a high impact strength. (9) It is light in weight. (10) It is easy to finish and polish. (11) Additional material can be added without remaking the entire structure. (12) If manufactured facings, crowns or acrylic teeth are used, the color and contour of the bridge can be determined before the completion of the entire bridge.

On the other hand, the material has the following limitations and disadvantages: (1) The acrylic resin is likely to be porous if it is not manipulated and processed properly. (2) If it is subjected to continuous or intermittent pressure, the restoration flows and loses its original contour and hence its contact points. (3) Restorations made of acrylic resin sometimes discolor in the mouth. (4) In the event of the failure of a pontic, it is almost inevitable that the entire restoration must be removed in order to make the repair. (5) The acrylic resin scratches easily. (6) There is the annoyance, for those persons who chew gum habitually, of having the gum stick to the restoration.

In fairness to the synthetic resins, it should be stated that their use for bridge prosthesis is relatively new and no doubt an improved resin will eventually be developed possessing the necessary physical properties. In the meantime it is well to remember that the use of synthetic resins for crowns and bridges is still on an experimental basis. The synthetic resins are not intended to supplant entirely the gold alloy or the baked porcelain restorations.

There are available several types of acrylic bridges. The first type, made entirely of acrylic resin, is usually indicated in the anterior region of the mouth and is limited to the replacement of one tooth. Since no metal framework is used, the abutment teeth are usually prepared for shoulder veneer crowns.

Another type of acrylic bridge employs metal retainers, such as complete crowns, three-quarter veneer crowns and intracoronal retainers, and uses pontics with acrylic facings instead of long-pin porcelain facings; the occlusal portion is of cast gold. This type of bridge is recommended in closed-bite cases.

The third type of bridge employing acrylic resins is made with an internal metal truss. When reinforced with metal, acrylic bridges have proved quite satisfactory. Almost without exception, acrylic bridges require some form of metal truss to prevent the displacement of the pontics by vertical, horizontal or rotary stresses. The truss should be made of an alloy which has sufficient strength, with a minimum of bulk, to withstand

the stresses to which the restoration will be subjected during use. Pure gold or pure platinum are not used because they lack the necessary physical properties. The metals preferred are either type "C" gold alloy or clasp metal. Sometimes platinum-iridium alloys are used, and recently some of the stainless steels have also been employed; however, the type "C" and the clasp metal alloys are adequate. Acrylic bridges employing a metal truss of the Granger type* have proved satisfactory from the standpoints of service, comfort and esthetics.

Causes of the failures of the reinforced type of acrylic bridge are: the proper alloy is not used in the metal truss; the truss is not of a sufficiently heavy gage; the truss is not properly designed to give the necessary retention and resistance to sheer or tortional stresses.

Although the standard type of bridge, utilizing gold alloy and porcelain facings, is still the restoration of choice in the majority of cases, there are times when it is impossible to have a sufficient amount of metal for strength and still make the restoration hygienic. In cases in which there is a small amount of vertical space available for the porcelain member of the pontic, the porcelain portion can be satisfactorily replaced with acrylic resin.

Dentures

The advent of artificial teeth made of the synthetic resins is a new milestone in the progress of prosthetic dentistry. These teeth are now available both in the anatomic and the nonanatomic molds, and are being furnished in the same standard colors in which the porcelain teeth are offered. Although the resin teeth have been used for only a few years, they apparently have proved sufficiently resistant to withstand masticatory stresses.

Although the resin teeth can be used everywhere that porcelain teeth are used in partial denture construction, there are certain precautions which must be taken in their use. For instance, it is not advisable to flame the waxed denture and expose the resin teeth to the direct flame. In completing the case, the dentist must take greater care in finishing the pink acrylic resin around the necks of the acrylic teeth than when porcelain teeth are used. In polishing, the acrylic teeth must be protected either with adhesive tape or by some other means so that the labial or buccal contour of the teeth is not reduced during the polishing operation. No solvents should be allowed to come in contact with the teeth because solvents cause checks to form in the teeth.

Not only are the acrylic teeth available in the same molds and shades as porcelain teeth, but also their manufacturing process has been improved so that in texture and density they are difficult to distinguish from baked porcelain. One of the main advantages of the resin teeth is that they do not abrade natural teeth or gold alloy restorations as do the porcelain teeth. It has been clinically observed that, if an undisclosed high spot exists in an acrylic tooth, little or no trauma will result, because the acrylic tooth will adjust its contour to the path of the opposing teeth.

Teeth made of the methyl methacrylate resins are not friable and will not fracture as easily as porcelain teeth. Moreover, they absorb to a large extent any impact that may be delivered to the restoration. In cases in which an immediate denture is constructed and in which a short vertical distance exists between the crest of the ridge and the opposing teeth, it is possible to grind acrylic teeth directly to the cast without allowing space for denture base material under the teeth, as would be necessary if baked porcelain teeth were employed. Because the chemical composition of the resin teeth is basically the same as that of the denture material, a perfect union

*The truss devised by Dr. Ernest Granger employs a cast ferrule to support the porcelain member of a baked porcelain bridge.

is formed between the two without any danger of separation or of checking of the teeth as sometimes occurs when porcelain teeth are used.

There is less tendency for a clatter to develop in the use of acrylic teeth as compared with porcelain teeth. Because there are no pins or hollowed out spaces in acrylic teeth, cleavage planes are less likely to exist than in porcelain teeth. The acrylic teeth are lighter in weight than porcelain teeth of the same size. Another advantage of acrylic teeth over the porcelain is that the re-forming and staining of the acrylic teeth can be accomplished more readily and the acrylic teeth can be refinished to a high polish more easily.

In a consideration of all the advantages which acrylic teeth possess, it must not be overlooked that they scratch easily when subjected to the cutting edge of a sharp point or to abrasive materials. If acrylic teeth are opposed by jagged or irregular edges of natural teeth or by porcelain teeth, they wear down rapidly, but, if they are opposed by natural teeth with smooth surfaces or by other acrylic teeth, the amount of wear is negligible.

Although the acrylic resins were primarily developed for complete dentures, their application to removable partial dentures was immediately apparent and at present the partial denture bases are made almost exclusively of synthetic resins. Partial dentures may be made entirely of acrylic resin or they may be made in combination with a metal framework. So great is their esthetic value that on this basis alone they justify their almost universal use in partial dentures.

Repairs

It is necessary at times to repair crowns, bridges and other prostheses which have been damaged or broken. Such repairs may be of either a temporary or a permanent nature. For either type the use of the acrylic resin simplifies the repair process.

When a porcelain veneer crown is fractured and the bite is unusually short or in an end-to-end relationship, it may be advisable to make the replacement of the fractured porcelain crown with an acrylic restoration.

Porcelain veneers are frequently dislodged or fractured, leaving the rest of the gold crown intact on the tooth. One of the most satisfactory methods of repairing a fractured porcelain veneer facing in a complete cast gold crown is accomplished by using acrylic resin. If the veneer is thin, it is advisable to place an underlying layer of opaque resin, over which the gingival and incisal colors are then distributed in the usual manner.

In the repair of a fracture of a porcelain facing in a Richmond crown, the technic of constructing the veneer is similar to that used for the veneer crown, except that provision must be made for the platinum pins which were part of the original porcelain facing.

Davis crowns, although used less today than formerly, still require repairs. In fractures of this type the dowel may still be present, firmly cemented in the root. If the incisal extension of the dowel is sufficiently long to give the necessary amount of mechanical retention to an acrylic crown, a solid acrylic crown is constructed, fitted to the root face and cemented over the dowel extension. In those instances in which the dowel has been dislodged from the root, a similar repair can be made, except that the dowel is processed into the crown and rigidly attached to it. A majority of such crowns can be remade more satisfactorily by using a cast gold core over which is placed a baked porcelain veneer crown.

The acrylic resins may be used satisfactorily in repairing bridges which require the replacement of broken long-pin porcelain facings or the replacement of

interchangeable porcelain teeth. Although it is possible to bake and fit new porcelain pontics to replace those fractured, it is much simpler to make such replacements with acrylic pontics.

Other Uses in Dentistry

The acrylic resins have other definite uses in dentistry. One of these is the construction of splints, which are of five general types: One type is employed in complete mouth rehabilitation, when the so-called bite opening technic is used. A second type is of a semi-permanent nature, in which a metal framework is combined with the acrylic resin. Such a splint is sometimes designed to conform to a predetermined occlusal plane. A third type of splint is used as an aid to orthodontic service and acts as a space retainer.

A fourth type of appliance used by some orthodontists is referred to as a "final positioner." This type of appliance, made of resilient resin, is also employed for adults who are in the habit of gnashing their teeth during sleep. With this appliance, when the spasm of grinding the teeth occurs, contact is immediately made between the opposing arch and the resilient resin; the resin cushions the grinding and dissipates the strain on the periodontal membrane, thus preventing wear on the natural teeth. This same type of splint, made of a tougher resin, is employed for athletes.

The surgical splint, which may be used postoperatively or during the treatment of a fracture of the maxilla or the mandible, is invariably made of the hard acrylic resins. It has been extensively used during the past war and has been fully described in the current literature.

During the last fifty years the construction of the prosthesis for the correction of the cleft palate has witnessed remarkable development as the result of the work of Kingsley, Case and Fitz-Gibbon. Although most of the early obturators were constructed of metal and of vulcanite, the advent of the synthetic resins offers the opportunity to make these appliances of a material which is strong, hygienic, esthetic and at the same time easy to manipulate.

In many of the obturators that are now being made, the border of the veil of the obturator consists of resilient resin and the rest of the appliance is made of hard resin. This technic of combining hard and resilient resins is particularly suitable for those patients who wear an obturator for the first time. The resiliency of the material permits the tissue to become gradually accustomed to the foreign object in the throat. Later the entire appliance may be made of the hard resin.

The resilient and elastic resins which are employed in somatoprosthesis are one of the most revolutionary and beneficial developments in the field of synthetic resins. The prostheses restoring noses, ears and other parts of the body have been improved rapidly during the past twenty-five years, owing largely to the use of the elastomeric resins which are today available to the dentist. These new resins have a tissue-like flexibility and a texture and a translucency which closely simulate the natural tissues. The first ears, noses, etc., made of the resilient synthetic resin were worn by a patient in 1941 and were reported in the literature in 1943. Since that time, materials have been developed which largely meet the necessary requirements for a satisfactory restorative resin.

Before the war thousands of artificial eyes were imported into this country from Europe, but the advent of the synthetic resins has enabled the prosthetist to produce the acrylic eye, which is far superior to the eye made of glass. It is now possible to reproduce exactly the size, shape and color of the remaining natural eye.—*185 North Wabash Avenue.*

INLAY IMPRESSIONS: USING A CLOSED-BITE TECHNIC

Albert L. Borish, D.D.S., Philadelphia

YEARS of experimentation with the various materials and methods used to reproduce the painstaking preparation for receiving the gold inlay have resulted in the method which we shall call the closed-bite wax impression. The resulting casting has the perfection that is claimed for the casting made by the direct method, and the technic possesses all of the advantages enjoyed by those employing the indirect technic.

A copper band, having about 1 mm. clearance around all of the surfaces of the tooth, should be fitted carefully around the tooth, and the buccal surface should be file-scratched for identification (Fig. 1). The band should be accurately festooned and properly adapted, a contouring and stretching pliers being used to aid in the fitting.

The band should then be shortened to the height of the marginal ridge of the approximating teeth to give the exact height of the inlay and to allow the patient to bring the teeth into occlusion without band interference (Fig. 2). The copper is removed over deeply undercut surfaces to aid in the removal of the impression and to avoid distortion.

The band is now ready to be filled with inlay wax, which is softened and molded (not melted and flowed) into the band.

Fig. 1.—Drawing showing copper band fitted around tooth. The buccal surface is file-scratched for identification

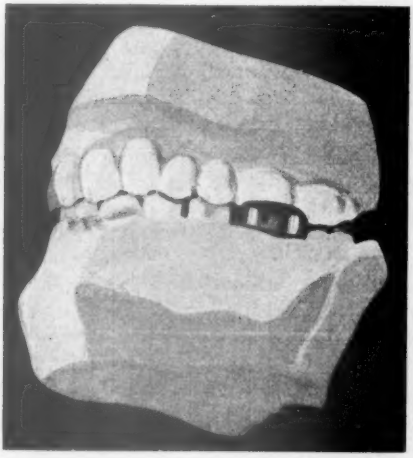

Fig. 2.—Drawing showing band in place and teeth in occlusion

The wax is seated over the tooth, which has been thoroughly lubricated with light mineral oil. The patient then brings the teeth into occlusion. After the wax is chilled, the impression is removed. The operator will be pleased by the ease with which this is done.

The impression is now ready to be boxed. Three-quarter inch scotch tape makes an ideal boxing medium. The die is then poured. After the setting of the die and the removal of the scotch tape, but before removal of the band, the buccal surface is pencilled the full length of the die for identification (Fig. 3*A*).

The band is then cut off with a small metal shears, the cut being made on the buccal surface or upon that surface of the band not to be used in the restoration (Fig. 3, *B* and *C*). The blue wax impression now remains as the wax inlay pattern, the occlusal markings being the guide so that resort to models or bite-blocks is not necessary. To aid in the removal of the wax pattern from the die, the waxed die with excess removed is immersed in light mineral oil for about ten minutes. After the wax is carefully dried, the pattern (before the carving is completed) is removed and the entire preparation is pencilled, so that the operator is given an over-all drawing of the extent of the finished inlay.

The one discrepancy in the pattern is at the contact points of approximating teeth, where there is a displacement of wax the thickness of the copper band. Wax in slight excess is added to correct this discrepancy, the excess being removed in the final fitting of the casting in the mouth.

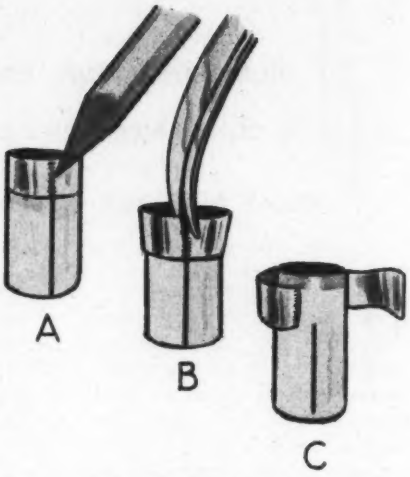

Fig. 3.—(A) Pencilling of buccal surface of die before removal of band. (B, C) Removal of band from die

This technic removes one step from the indirect method with the compound or other material, and the ensuing articulating model construction steps. This technic also gives the operator his original impression as his pattern, which is what he obtains when he utilizes the direct method only. In addition, this technic gives all those admitted advantages of the indirect method: it saves time in the chair, and it produces a die upon which to carve the inlay properly and to finish it beautifully.—*255 South Seventeenth Street.*

DIMENSIONAL STABILITY OF ALGINATE IMPRESSION MATERIALS

E. W. Skinner,* Ph.D., and Carlos E. Pomés,† M.S.D., Chicago

THE alginate impression materials which appeared during the war will remain to replace to some extent the agar hydrocolloid materials for which they were substituted. The alginate materials differ from the agar hydrocolloid materials in that the final product is attained by a chemical reaction rather than by a simple gelation from a colloidal sol. They offer the advantage that no heat is necessary for their preparation, and consequently there is no danger of burning the mouth of the patient.

Unfortunately, the accuracy of casts made from some of these materials has been disappointing in the hands of some dentists. Extensive research by us indicates, so far as it has been carried to date, that much of the fault lies with the manipulation and not with the material.

An excellent description of the chemistry involved in the setting of these materials has already been published.[1] In summary, a soluble alginate, such as potassium alginate, is dissolved in water to form a soft gel. While the impression is in the mouth, it is partly reacted to an insoluble alginate, such as calcium alginate, which is comparatively firm and elastic. In this condition, the impression can be removed over undercuts and dovetails. A retarder is added so that the soluble alginate will not react to the insoluble form until the filled impression tray is placed in the mouth.

An insoluble type of alginate impression material has been perfected[1] in which the insoluble alginic acid is reacted to soluble potassium alginate, which is in turn changed to the insoluble calcium alginate as already outlined. Material H (see the accompanying table) is of this type, but all of the other materials are presumably soluble alginates.

The present report deals with the dimensional changes of the materials as affected by their environment; the plan of attack is much the same as for a previous study on the reversible hydrocolloids.[2] The materials tested are given in the accompanying table, together with the code letters with which they are later designated in the presentation of the results. All materials were purchased on the open market. No attempt is made to discover which material is the most suitable; the data are presented in an attempt to account for vagaries in results as they may be found in dental practice.

The dimensional changes were observed by pouring the material into a metal trough lined with waxed paper. Two markers were embedded in the

*Professor of physics, Dental School, Northwestern University.

†Cirujano dentista; research fellow, Dental School, Northwestern University.

1. Schoonover, I. C., and Dickson, George: Preparation and Characteristics of Elastic Dental Impression Compounds with an Alginate base. J.A.D.A. 30:565, April 1, 1943.

2. Skinner, E. W., and Kern, W. R.: Colloidal Impression Materials. J.A.D.A. 25:578, April 1938.

Alginate impression materials investigated

Code Letter	Name of Product	Manufacturer or Distributor
A	Reprolastic Powder	Reliance Dental Manufacturing Co., Chicago
B	Lang Elastic Impression Material	Lang Dental Manufacturing Co., Chicago
C	Coe-Loid Powder	Coe Laboratories, Inc., Chicago
D	Zelex	The L. D. Caulk Company, Milford, Del.
E	Opaloid Elastic Impression Powder	The Opalex Co., Kansas City, Mo.
F	D-P Three-in-One Cream	Dental Perfection Co., Los Angeles
G	D-P Elastic Impression Cream	Dental Perfection Co., Los Angeles
H	Fink Precision Impression Powder	Plastodent, Inc., New York

material 20 cm. apart; comparator microscopes were focused on the markers and subsequent dimensional changes were measured, starting with the time of setting. The setting time was determined as the time from the start of spatulation when a metal tube, bore of 10 mm. and wall thickness of 1 mm., produced a sharp, clean impression after it had been impressed into 50 cc. of the material. This test was adopted from a similar test for the gelation temperature of the reversible hydrocolloidal materials.[3] Studies on setting time will be presented in another paper. The environment of the specimens could be changed at will to introduce various liquids or water-saturated air. All of the data presented are the average of two to four trials. In most cases, the various experiments could be repeated with excellent agreement.

Exposure to Air and Water

Each material was exposed to air for the first eighty minutes after the spatulation, and subsequently immersed in water for 180 minutes. In a similar experiment using the agar-base colloidal impression materials, Skinner and Kern[2] demonstrated a shrinkage from the start of observation. It is noteworthy that a small initial expansion was noted with all of the alginate materials, as shown in the graphs in Figure 1. The ultimate effect of such an expansion on the accuracy of the impression depends upon the general contour of the impression tray and the adhesion of the material to the tray.

The cause of this initial expansion may probably be attributed to a continued imbibition of water by the soluble alginate. The calcium alginate exhibits hydrophobic tendencies, in that it actually repels water during its formation. Free water undoubtedly is present in the interstices between the soluble-insoluble alginate matrix present at the conclusion of the setting, and perhaps some water may have been absorbed by the fillers. The gel formed by the soluble alginate is undoubtedly lacking in water, and reaches equilibrium by imbibition after the setting time. The time that the maximum expansion is reached (Fig. 1) very likely marks the attainment of equilibrium. The subsequent contraction which ensues in air is due partially to a further formation of calcium alginate, and also to a syneresis* by the evaporation of water. It is interesting to note that, in general, the alginate impression materials shrink less during the first hour in air than do the agar materials, according to the

3. Paffenbarger, G. C.: Hydrocolloidal Impression Materials: Physical Properties and a Specification. J.A.D.A. 27:986, March 1940.

*The contraction of a gel.

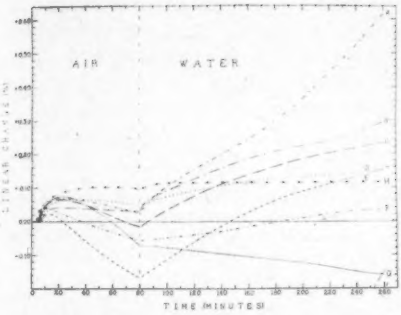

Fig. 1.—Change in dimension in air and water. The water was poured over the specimen at the end of eighty minutes

previously published data on the latter materials.

At the end of eighty minutes, water was poured over the specimens. The resulting expansions of the materials are not unlike the similar results in the case of the agar materials.[2] All of the materials, except G and H, expanded, presumably because of the imbibition of water. It is evident that the impression cannot be stored in water, without an impairment of its accuracy. Material G continued to contract in water, a fact which might indicate a continuation of the formation of an insoluble alginate. Material H appears to be stable both in air and in water.

The Use of Fixing Solutions

The fixing solution is recommended presumably for two reasons: (1) to stabilize the impression and (2) to overcome the retardative effect which any syneretic product appearing on the surface of the impression may have on the setting of the cast material.

It can be reasoned that, if an impervious film of some nature can be formed over the surface of the impression, no molecular exchange can take place between the impression material and the atmosphere, with no resulting imbibition and syneresis and with no resulting dimensional change. Such a film can be obtained by soaking the impression in almost any metallic salt which will produce an insoluble alginate. This process generally will produce an alginate film more insoluble than calcium alginate. From a theoretical standpoint there are at least two objections to this procedure: (1) The very fact that a more insoluble alginate is formed indicates a contraction, and it is possible that the formation of the surface film may defeat the original purpose, that is, to reduce the dimensional change. (2) The formation of such insoluble films is likely to be incomplete, with "pinpricks" or small holes occurring on their surface, and consequently they will be pervious.

Fortunately, the second reason for the use of a fixing solution is closely related to the first, since all of the metallic salts which may be used to produce such insoluble films (except ferric sulfate) are also accelerators for the setting of gypsum products. It is characteristic of any gel that syneresis (or contraction) generally begins when the gel is allowed to remain in the atmosphere. The alginate gels are no exception to this, and the products of the syneresis are likely to produce a retardation of the setting of the plaster or stone cast in contact with its surface. Consequently, the fixing solution must contain some type of an accelerator for plaster of paris or hydrocal. When the surface of the alginate impression is saturated with such a solution, any retarding effect of the products of syneresis is overcome, and the surface of the cast should therefore be firm and hard when the impression is removed from the cast.

Fixing solutions were indicated by the manufacturers of four of the materials. The previous experiment was repeated after immersing each of the materials in their respective solutions for ten minutes. The graphs for the dimensional

changes obtained after such treatment are presented in Figure 2.

The fixing solution for material C was a combination of potassium sulfate and zinc sulfate. The solution for material D was potassium sulfate, that for material E was potassium sulfate and manganese sulfate, and a solution of alum (type not known) was used with material H. A comparison of Figures 1 and 2 indicates a tendency toward stabilization, but the effect is not great. However, the effect of the heavier metals in the fixing solution is evident. The ultimate effect of the fixing solution for material D, containing only potassium sulfate, was a swelling or increase in size, whereas in all other cases the resulting change in dimension was less when the fixing solution was used. In fact, material E exhibited an ultimate contraction. The rather abrupt contraction of material H after a rapid rate of initial expansion is noteworthy.

Composition of Fixing Solution

It was stated in the previous discussion that almost any metallic salt, which would accelerate the setting of a gypsum product, could be used in a fixing solution for an alginate impression material. Since such accelerators are generally sulfates, the metallic salts tend to be restricted to the sulfate group. For example, Worner[4] reports that solutions of the sulfates of nickel, copper and iron can be used for this purpose. Schoonover and Dickson[1] advocate the use of a solution of manganese sulfate for an insoluble alginate impression material.

Two per cent solutions of six different sulfates were studied as fixing solutions for alginate impression material C. The graphs for the dimensional changes of the same amount of material, manipulated in the usual manner, and then

4. Worner, H. K.: Impression Materials with an Alginate Basé. Austral. J. Den. 48: 51, June 1944.

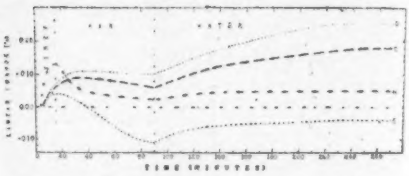

Fig. 2.—Change in dimension under environments similar to those in Figure 1, after soaking the materials in the fixing solutions supplied with each material for ten minutes

exposed to the various fixing solutions for thirty minutes, are presented in Figure 3. It is not advocated than any impression be exposed in practice to a fixing solution for as long as thirty minutes, but from an experimental standpoint such a prolonged exposure time is of value in determining any tendencies toward stabilization.

The tendency of all of the fixing solutions to stabilize the impression is evident. The fixing solution used for obtaining curve *b* is approximately a 2 per cent solution of a mixture of potassium and zinc sulfates. The use of potash alum in a fixing solution (curve *c*, Fig.

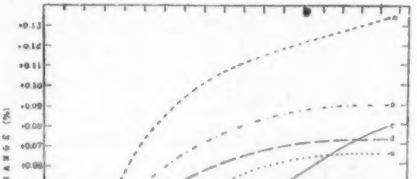

Fig. 3.—Effect of various fixing solutions on the linear dimensional change of material C. (a) Control (in water only). (b) Fixer supplied by manufacturer ($ZnSO_4$ and K_2SO_4). Two per cent solution of salts of (c) $AlK(SO_4)_2.12H_2O$. (d) $MnSO_4.2H_2O$. (e) $FeSO_4.7H_2O$. (f) Na_2SO_4. (g) K_2SO_4. (h) $CuSO_4.5H_2O$

3) apparently acts to stabilize the material better during the first ten to fifteen minutes of immersion than it does later. Apparently the use of this chemical is not to be preferred to most of the others.

The solutions of manganese sulfate (curve *d*) and ferrous sulfate (curve *e*) both appear to be satisfactory fixing solutions. Two per cent solutions each of sodium and potassium sulfate (curves *f* and *g*, respectively) appear to produce the best stabilizing effect on this material of any of the salts, at the given concentration. The use of copper sulfate solution (curve *h*) is apparently contraindicated, owing to an actual contraction which begins after an immersion of approximately six minutes.

Concentration of Fixing Solution

The previous experiment dealt only with a single concentration of the solution of each salt—namely, 2 per cent. The concentration of the fixing solution may, of course, affect the stability of the impression material to a considerable extent. As a matter of fact, the stability of the gel can be affected only by varying the concentration of a fixing solution. For example, when potassium sulfate is used in a fixing solution, the formation of an insoluble film on the surface of the impression, which might aid in stabilization, does not occur. The effect of stabilization is gained by the fixing solution with potassium sulfate solely by producing a solution of the proper osmotic pressure.

One of the original products of reaction between the soluble potassium alginate and calcium sulfate is potassium sulfate in solution. This solution of potassium sulfate is probably the dispersion medium of the gel, and its osmotic pressure will largely determine the eventual stability of the gel. Consequently, if an impression made with the gel is immersed in a solution of potassium sulfate with the same osmotic pressure as that of the dispersion medium, equilibrium conditions will prevail, and no change in dimension will occur.

In order to test the effect of varying concentrations of potassium sulfate on the dimensional stability of impression material C, solutions of molecular concentrations of 0.5, 1.0, 2.0, 5.0, 7.5, 10.0 and 12.0 per cent, respectively, were used, and the dimensional changes of specimens of material C were measured in the usual manner, when the specimens were subjected to the various concentrations, each for a period of thirty minutes. The data are presented graphically in Figure 4.

It can be observed that at no time was the initial expansion completely suppressed. The changes observed can be generally interpreted on the basis of a balance of osmotic pressures. Apparently equilibrium conditions are most nearly reached for this material with a solution concentration of 2 per cent, although from a practical standpoint the stabilization obtained with any of the solutions is good. When concentrations of 5 per cent or greater were used, surface disintegration of the impression was observed. In fact, this observation demonstrates a serious drawback to the use of a solution of potassium sulfate as a fixing solution. Since this salt is one of the products of the original reaction, the reaction will obviously be reversed if it is present in excess, and the im-

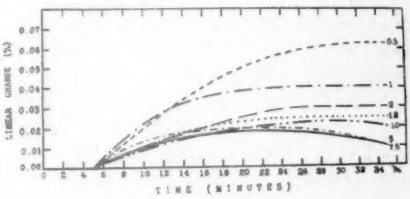

Fig. 4.—Effect of the concentration of solutions of potassium sulfate on the stability of impressions made with alginate material C. The concentrations (percentage by weight) are given at the right of each curve

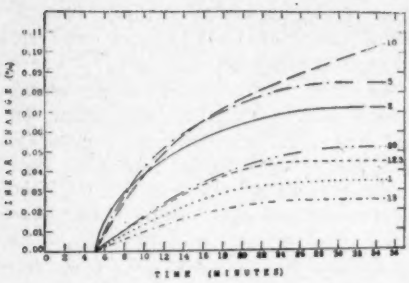

Fig. 5.—Effect of the concentration of solutions of manganese sulfate on the stability of impressions made with alginate material C. The concentrations (percentage by weight) are given at the right of each curve

pression will disintegrate. At low concentrations (2 per cent or less), the amount of reversal or disintegration will be negligible during the ten to fifteen minutes that the impression is immersed in the potassium sulfate. However, if the operator should inadvertently allow the impression to remain in the fixing solution for several hours or overnight, the effect might be disastrous. As a safety measure, a metallic sulfate can be added to the solution of potassium sulfate in order to provide an insoluble film of alginate over the impression. The film cannot, of course, prevent the eventual solvent action of the potassium sulfate, but it can greatly reduce its rate of action.

The effect of the concentration of two other fixing solutions containing metallic sulfates was studied, and the results for solutions of manganese sulfate and zinc sulfate on material C are presented in Figures 5 and 6, respectively. The specimens were prepared as in the two previous experiments. The concentrations of each solution (percentage by weight) are given at the right of each curve, which represents the results obtained for the respective solution.

It is evident from the graphs that the effect of concentration of the fixing solutions on the dimensional change cannot be explained entirely on the basis of differences in osmotic pressures. Apparently the effect is more complicated than was the case with potassium sulfate. From a practical standpoint, the effect of the concentration of the solution of zinc sulfate on dimensional change is not great, if concentrations of 2 per cent or greater are used. In the case of the solutions of manganese sulfate, the effect of concentration appears to be somewhat more critical and extremely complicated.

No particular solution or concentration can be selected at this stage of the investigation as being the best fixing solution. Obviously, the one which appears to give the greatest dimensional stability to the impression is the best in this regard, but there are other factors of equal importance, such as the surface hardness of the cast. Further studies in this regard will be reported in future papers.

Storage of Alginate Impressions

In a previous publication,[2] it was demonstrated that it is virtually impossible to store the agar impression materials in any environment, without a serious dimensional change resulting. For example, if the materials are stored in water, they tend to expand or swell by imbibition. If they are stored in air, regardless of its relative humidity, they tend to contract.

The same conditions exist for the alginate materials (Figs. 1 and 2) when they are stored either in water or in air of an average relative humidity of 40 per cent. The practical application of these

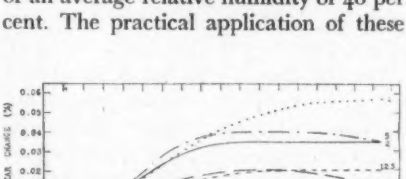

Fig. 6.—Effect of the concentration of solutions of zinc sulfate on the stability of impressions made with alginate material C. The concentrations (percentage by weight) are given at the right of each curve

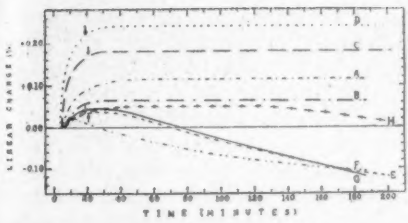

Fig. 7.—Effect of a water-saturated atmosphere on the dimensional change of the alginate impression materials

observations is very important. It is our observation that a great many of the complaints of inaccurate casts obtained with these materials are due to the fact that the impression has been allowed to dry out in the air, with a resulting shrinkage and warpage. Such a condition may prevail, for example, when the impression is sent to the commercial laboratory before the cast is constructed.

In order to complete the study as to the effect of the relative humidity of the air on the dimensional stability of the alginate impression materials, specimens prepared and measured as in the previous experiments were subjected to an environment of 100 per cent relative humidity and were observed for at least three hours. The data are plotted in Figure 7. The small arrows indicate when the set materials were removed from their respective fixing solutions. The fixing solutions supplied by the manufacturer were used; not all of the manufacturers require the use of a fixing solution.

The results for materials A, B, C and D are particularly noteworthy. The dimensional stability for these four materials is excellent when they are stored in an atmosphere of 100 per cent relative humidity. Specimens of materials B and D were observed under this environment for as long as thirteen hours, with no detectable change. Material H exhibited a slight tendency to contract, and the remaining three materials shrank. Apparently the casts for materials E, F and G must be poured immediately upon removal from the mouth, or, in the case of material E, after removal from the fixing solution.

Summary and Conclusions

Eight commercial alginate impression materials have been studied in reference to their dimensional stability after setting under various environments. The effect of different fixing solutions on one of the impression materials has been studied in reference to composition and concentration. The following facts may be deduced from the data presented:

1. A small initial expansion of the materials always occurs during the first few minutes after the setting time. If the set materials are exposed to the air, a shrinkage occurs. If they are immersed in water, a swelling takes place in most cases.

2. Four of the materials were found to be dimensionally stable if they were stored in an environment of 100 per cent relative humidity.

3. The use of a fixing solution tends to increase the dimensional stability of the alginate impression material, particularly if it contains a metallic salt which will produce a film of insoluble alginate. However, the use of a solution of copper sulfate is contraindicated, since it produces a contraction.

4. The concentration of the fixing solution affects the dimensional change of the impression material considerably, within certain limits. The effect can be related to osmotic pressures between the solutions and the gel, in some cases, but with some of the solutions unknown phenomena take place.

Clinical Applications

According to the data presented, the dimensional stability of the alginate impression materials is certainly as adequate as that of the agar impression materials, and in some respects it is better. If the

directions supplied with the respective materials are followed faithfully, there is no reason why most of the materials studied in this investigation should not produce accurate casts, so far as the data presented herewith are concerned.

Under no conditions should the impression be stored in air, since a contraction occurs. Neither should it be stored in water, since either a swelling or further contraction results. In the case of four of the materials, apparently the impression can be stored in air with a relative humidity of 100 per cent. If the impression must be sent to a commercial dental laboratory, it can be suspended in some type of humidor and kept stable for a number of hours. However, such a procedure is not entirely satisfactory, since changes in temperature and release of strains may occur; such changes would not be discovered under the conditions of our experiments.

The best method to take full advantage of the accuracy of these materials is to pour the cast immediately after the impression is removed from the mouth or the fixing solution. Such a procedure is imperative with some of the materials, since the dimensional stability of impressions made with them cannot be controlled by any known method of storage. As a general rule, immediate pouring of the cast is recommended for all hydrocolloid materials, whether they are of the agar or alginate type.

For the benefit of the dentist who wishes to use his own fixing solution, dilute solutions—not over 2 per cent—are recommended. According to the data published in this paper, possibly a combination of potassium sulfate and any of the metallic salts mentioned under Figure 3 can be used. Potassium sulfate is known to be an excellent accelerator for gypsum products, and the metallic sulfate aids in stabilizing the impression.—*311 East Chicago Avenue.*

THE TEMPOROMANDIBULAR JOINT: THEORY OF REFLEX CONTROLLED NONLEVER ACTION OF THE MANDIBLE

Marsh Robinson,* A.B., D.D.S., M.D., Santa Monica, Calif.

The temporomandibular joint has recently attracted renewed attention in its relationship to dental conditions. Many misconceptions concerning the function of the oral mechanism are perpetuated through accepted texts of former years, and accessible anatomic knowledge has not been fully applied in connection with oral physiology. The aim of this discussion is to advance a new theory of reflex controlled nonlever action of the mandible based upon anatomic and histologic findings.

The tissue found in the joint is not of the type found in stress-bearing areas. Therefore, it is reasonable that there should be no appreciable stress in the temporomandibular joint. Comment will be made as to the conditions necessary

*From the Department of Anatomy, University of Southern California, School of Medicine.

for stress in the denture. Joint function without stress will be explained by direction of muscle action. The principle of neuromuscular regulation of the jaw will be presented.

There is no field of dentistry in which a knowledge of oral physiology is not necessary for rational treatment. Questions of anatomy and physiology arise from such problems as interdental relationships, Costen's syndrome and movements of an articulator. Such misconceptions as the following must be cleared away:

1. The temporomandibular joints are stress bearing.
2. The mandible is a Class III lever.
3. The anterior fibers of the temporalis muscle cause the mandible to protrude.
4. The posterior fibers of the temporalis muscle elevate the jaw.
5. The temporalis muscle originates from the galea aponeurotica.
6. The masseter muscle causes the mandible to protrude.
7. Centric condylar position is in the deepest posterior portion of the mandibular fossa.
8. The joint is lined by a synovial "membrane."
9. The disk is composed of fibrocartilage, which is not repairable.

Material and Methods

The anatomic material consisted of fifty-nine cadavers, both male and female, with no discrimination as to race or color. The average age was 65.1 years. Of the group, 44 per cent were edentulous, and the remainder had from two teeth to a full complement. The average was eight maxillary and nine mandibular teeth. An additional sixteen dissections by the late Dr. Varian were made available by the University of Southern California, College of Dentistry. The cadavers all had a full complement of teeth.

Two methods of study were employed: (1) detailed dissection of the masticatory organ with special reference to bone, ligaments, cartilage and direction of muscle fibers and (2) saw-cut sections made in different planes with special reference to the sagittal planes.

Temporomandibular disks were obtained by the intracranial approach from sixteen necropsies at the Los Angeles County General Hospital. These were from eleven white males and five white females who averaged 42 years of age, ranging from 1 year to 88 years. Three were edentulous and five had a full complement of teeth. The disks were fixed in formaldehyde solution. Without decalcification, they were embedded in paraffin and sectioned in the anterior-posterior plane at 6 microns. Sections of each disk were stained with hematoxylin-eosin, a Mallory-type connective tissue stain and a resorcinol-fuchsin elastic tissue stain.

Temporomandibular Joint as Currently Described

The bony parts forming the joint are the head of the condyle of the mandible and the mandibular fossa and articular tubercle of the temporal bone. A capsular ligament, thin and loosely arranged, is attached above to the margins of the articular surface and below to the neck of the condyle. Placed between these two bones is a plate of "fibrocartilage," the articular disk. It is molded to conform to the respective articular surfaces and attached at its circumference to the inner surface of the capsular ligament. As a result, it divides the joint into two parts, one above and one below the disk, each of which is usually said, incorrectly, to be lined with a "synovial membrane."[1] The nerve supply comes from the auriculotemporal and masseteric branches of the mandibular nerve. The blood supply

1. Gray, Henry: Anatomy of Human Body. Ed. 24. Philadelphia: Lea & Febiger, 1942.

Fig. 1.—Sagittal cut through center of joint. a, inferior synovial cavity; b, superior synovial cavity; c, articular disk; d, articular tubercle; e, condyle; f, capsular ligament; g, nonmedullary bone separating glenoid and middle fossae

is from the superficial temporal branch of the external carotid artery.

Findings

The inferior synovial cavity (Fig. 1) is the smaller of the two joint cavities, and it is here that the ginglymoid, or hinge, action takes place. In the larger upper synovial cavity, the arthrodial, or gliding, action occurs. There are no true "spaces" or "cavities," only a "potential" cavity existing. All surfaces are in con-

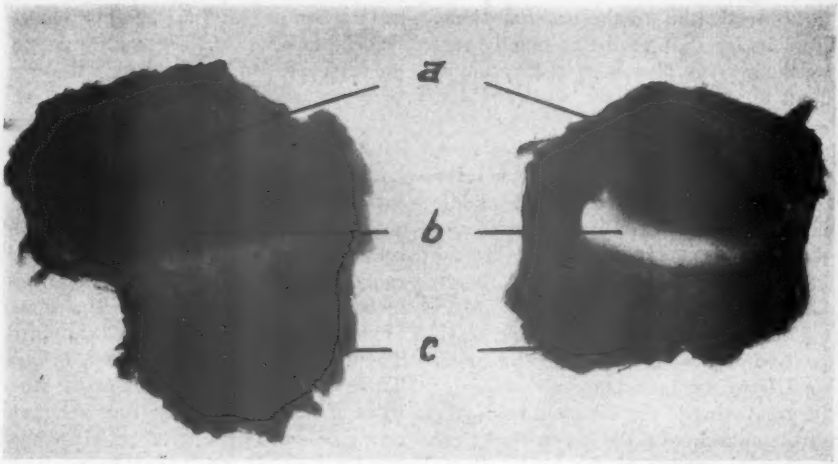

Fig. 2.—A, superior surface of gross disk. B, inferior surface of gross disk. a, vascular area above condyle; b, avascular part; c, insertion of external pterygoid muscle

tact. These are lubricated by a small amount of synovial fluid. The term "cavity" is used in the same sense as pleural or peritoneal "cavities." The condyles, in centric relation, are closest to the posterior surface of the articular tubercle. This, the thinnest part of the disk (Fig. 2), is approximately at the junction of its anterior and middle thirds. Here, the disk is firm, white and translucent. Above, the condyle is separated from the temporal bone by the thickest part of the disk. This distance is approximately four times that of the bone separation at the anterior surface of the condyle. The disk is in the upper part grossly vascular and less dense. The temporal bone presents the bulky articular tubercle in the forward part. Above the condyle, the bone is very thin and devoid of medullary structure. In no instance was a perforation found between the glenoid fossa and the middle fossa, but, in many, the separating bone was paper thin. The posterior part of the capsule is attached to the deep portion of the glenoid fossa. In centric relationship, this part of the capsule is loose and partially folded in, so that the condyle may move downward and forward on the articular tubercle.

The fan-shaped temporalis muscle (Fig. 3) originates from the temporal fossa and from the internal surface of the temporalis fascia. The anterior fibers of this muscle are perpendicular to the occlusal plane. The posterior

Fig. 3.—Temporalis muscle. a, anterior fibers perpendicular to occlusal plane; b, posterior fibers parallel to occlusal plane; c, coronoid process; d, cut surface of zygomatic arch, removed

fibers are parallel to the occlusal plane. From its insertion at the coronoid process, the average fiber takes a direction at about a 45-degree angle backward and upward.

The masseter muscle originates from the zygomatic arch in two layers: the external from the anterior and middle parts, the internal from the middle and posterior parts. It is inserted in the lateral surface of the ramus of the mandible.

The external pterygoid muscle originates with two heads: the smaller upper head from the infratemporal surface of the great wing of the sphenoid below the infratemporal crest, the lower head from the lateral surface of the lateral pterygoid plate, the pyramidal process of the palatine bone and, partly, the maxillary tuberosity. The fibers converge backward and laterally to be inserted in a depression in the anterior aspect of the condyle neck and the anterior edge of the disk.

The internal pterygoid muscle originates in the pterygoid fossa, a small part originating in the maxilla. The parallel fibers run downward, backward and somewhat laterally to insertion in the medial surface of the angle of the mandible and its environs.

The plane of the temporalis muscle approximately bisects the angle formed by the masseter muscle and internal pterygoid muscle.

Histologic Findings

Only the areolar type of the synovial layer is distinguished microscopically in the articular disk. (Fig. 4.) The areolar type is a closely packed cell-rich layer averaging three cells deep and it is seen as a distinct membrane. In the midsagittal plane, the areolar type of synovial layer is found covering the posterior one-third and the anterior one-sixth of the disk. There is a small transition area between the synovial layer and the central portion of the disk where no definite synovial layer exists. The central part of the disk has an incomplete cell layer. Collagenous fibers form most of the surface, with only an occasional fibroblast. These surface fibroblasts have unusually long processes, running parallel with the surface.

Fibrocartilage is characterized by oval cells with homogeneous capsules arranged in groups extending lengthwise in rows. Typical fibrocartilage was not found in any of the disks examined. There are no homogeneous capsules. These are easily distinguished in other parts of the body because they are more refractile, with an altered staining reaction, and often have concentric striations. A transition type between fibrocartilage and fibrous connective tissue is increasingly evident in disks of persons over 20 years of age. The cells are generally oval, but many variations occur. Near the surface, parallel rows are evident, but otherwise there is a random distribution. The interstitial substance contains wavy, compact collagenous bundles. This type of tissue, found in the disks of older subjects, is in the middle one-third and the posterior half of the anterior third.

Wavy, thick, closely packed parallel collagenous bundles are the main constituent of the fibrous connective tissue. The fibroblasts are arranged in the spaces between and parallel to the collagenous bundles. This tissue constitutes the main bulk of the disk. In the children under 16 years of age, it forms nearly the entire disk. In the older group, this tissue is found in the areas covered by the areolar type of synovial layer. Only in the central area is there a tendency to a transitional fibrocartilage type.

Blood vessels are found only in those areas covered by the areolar type of synovial layer. The vascular plexus is particularly rich, especially near the surface, where many capillaries are found in the synovial layer itself.

Fig. 4.—Microscopic section of disk, sagittal section (×6). a, vascular area covered by synovial layer, above condyle; b, avascular dense connective tissue. Position of disk is shown in Figure 1

Arguments

1. The type of tissue found is not regularly located in areas of stress by compression.

(a) Synovial Layer: The synovial layer in man is a definite entity only in those areas where synovial fluid is elaborated. This occurs in all diarthrodial joints over fat pads and loose areolar tissues which are nonstress bearing. The synovial layer covers articular cartilage only up to the fourth fetal month. Nowhere in the body is a definite synovial layer found to be covering a stress-bearing area of a joint. The disk above the condyle is covered by a definite synovial layer; therefore, it can be said that the condyle does not transmit stress upward to the temporal bone.

(b) Disk: "Fibrocartilage" disks are also found in the knee, ulnocarpal and costosternal joints. In these areas, the disks are nonstress-bearing structures. This is evident in the knee joints of older persons when the articular cartilage has been worn away and the bony surfaces eburnated, and yet the "fibrocartilage" disks are still present even though the joint space has closed an appreciable amount. Also, the removal of the disks from the knee does not interfere with the stress-bearing function. In the wrist, the radiocarpal joint is the stress-bearing joint, but the "fibrocartilage" is found only in the nonstress-bearing ulnocarpal joint. The costosternal joints are certainly not stress bearing since inspiration is the active process and expiration a passive process. As "fibrocartilage" is not found in heavy stress-bearing areas, there is reason to believe that heavy stress is not developed in the temporomandibular joint.

(c) Vascularity: Stress-receiving cartilage is avascular and is nourished by blood vessels at the periphery of the stress-bearing area. The disk above the condyle is thick and vascular. (Figs. 2 and 4.) The function of this highly vascular part of the disk is to supply blood to the area for the nourishment of the associated structures; to act as the source of the synovial fluid, especially the mucin necessary for lubrication of the joint, and to dispel any heat that may be generated from the action of the joint. From the position of this vascular pad above the condyle, it is obvious that no heavy stress is transmitted upward through this pad to the temporal bone.

(d) Nerves and Lymphatics: Kling[2] states that both nerves and lymphatics are found in subsynovial tissue, as well as a rich vascular supply. Since neither nerves nor lymphatics are found in other

2. Kling, D. H.: Synovial Membrane and Synovial Fluid. Los Angeles: Medical Press, 1938.

parts of the body which are in stress-bearing areas, stress is not transmitted upward through the condyle to the temporal bone.

(e) Bone: The bone that separates the upper part of the glenoid fossa from the middle fossa is very thin. (Fig. 1.) There is an absence of cancellous bone. Bone that is meant to receive stress is cancellous, with a covering of dense cortical plate. Here, it is again obvious that significant stress is not transmitted upward through the condyle.

2. Heavy stresses are normally developed in the mandible only when there is a definite stop in the denture area.

It must be remembered that when the teeth are not in contact, the action of the muscles of mastication is isotonic; i.e., the muscles contract when one end is attached to a light weight, in this case the weight of the mandible, which is lifted when the muscle shortens. The force necessary to move the mandibular teeth through food is usually not great. It is very slight in comparison to the isometric contraction. It is only when the teeth are in contact or when some hard object capable of transmitting heavy stress is placed between the teeth that stresses of appreciable magnitude are developed. This is isometric contraction; i.e., contraction occurring when the two ends of the muscle are fixed so that the effort of contraction does not shorten the muscle. The fact that the teeth are in occlusion prevents further movement of the mandible toward the skull. Theoretically, no work is done by the muscles, as there is no movement of the mandible, and all the energy goes to developing stress in the denture. This energy is dissipated as heat. The muscles can now develop stresses that have been estimated to be as much as 125 pounds.

For this reason, the stress in the mandible in the centric tooth contact relationship will be considered.

3. The direction of muscle pull places all the resultant force in the denture area.

In parallel fibered muscles, the direction of pull is in a straight line joining the middle of the surface of origin with the middle of the insertion surface. The bulk of the parallel fibered masseter muscle has an approximate direction from the angle of the mandible to the outer canthus of the eye. Its deeper part functions more in conjunction with the anterior fibers of the temporalis muscle.

In the sagittal plane, the internal pterygoid has approximately the same direction as the masseter. Its function in the lateral excursions is not to be considered here; nor is the function of the external pterygoid, which, for our purposes, is not directly concerned with the stresses in centric relationship.

It has long been known that the temporalis muscle does not act as a unit. It is often divided, for description, into thirds. The anterior fibers are perpendicular to the occlusal plane and act to close the jaw. The muscle fans out so that the posterior fibers are parallel to the occlusal plane. (Fig. 3.) The posterior fibers act to pull the mandible backward. The broad sweep of fibers in between aid in varying degrees in both actions, so that, if the entire muscle were to act, the pull would be approximately 45 degrees back and upward.

Although it is fully realized that the muscles do not act as single units, their various parts acting in a complex coordinated manner, the muscles will, for the purpose of illustration, be considered as acting as units. To simplify the illustration, it is justifiable to consider the masseter and the internal pterygoid as exerting one pulling action in the plane of the temporalis. The plane of the temporalis muscle bisects the angle formed by the masseter and internal pterygoid muscles.

Let the spring in Figure 5, left, represent the combined forces of the masseter and internal pterygoid muscles acting in

Fig. 5.—Left: Model of forces developed without action of temporalis muscle. The spring represents the combined forces of the masseter and internal pterygoid muscles. X, point of rotation. J, force in joint. C, rotation of coronoid process. Right: Spring representing temporalis muscle in action. R, resultant. F, fossa removed, showing nonlever action

the plane of the temporalis. When tooth contact is obtained, the muscle pull tends to rotate the mandible on the back tooth, contact *X*. The rotation force is represented in the condyle by arc *J*, and stress would be developed in the joint except for the counteracting pull of the temporalis muscle. As shown by arc *C*, the rotation force at the attachment of the temporalis is approximately forward. The posterior component force of the temporalis muscle (Fig. 5, right) counteracts the rotation force developed by the masseter and the internal pterygoid. The component force of the temporalis muscle, which pulls the mandible backward in a plane parallel to the occlusal plane, does not contribute any force to closing of the jaw. This component functions to keep the mandible from rotating and developing traumatic stress in the joint.

A resultant (Fig. 6, *R*) is the directed quantity the effect of which is equivalent to that of two or more other directed quantities of the same kind, called its components. A resultant is the sum of vectors found by geometric addition. Geometric addition is accomplished by the parallelogram of forces: a parallelogram two of the adjacent sides of which represent in magnitude and direction two vector quantities. The diagonal of the parallelogram drawn from their junction represents their resultant. This is based on two concepts regarding rigid bodies: 1. A force may be supposed to be applied indifferently at any point in its line of action. 2. Two forces in intersecting lines may be replaced by a force which is their geometric sum acting through the intersection.

The mandible may be thought of as having the muscles attached in the region of the dental arches where resistance is encountered. If the power acts at the point of resistance, there is no lever action.

How does the nonlever concept of jaw action fit the particular case? We have seen from the anatomic structures that there is no provision for the de-

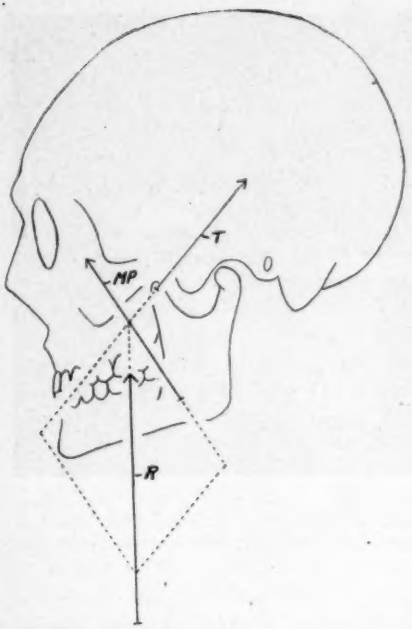

Fig. 6.—Parallelogram of forces. R, resultant of components T and MP. T, component force of temporalis muscle. MP, component force of masseter and internal pterygoid muscles in plane of temporalis muscle

velopment of heavy stress in an upward direction in the joint. On the other hand, the dental arches are so formed as to receive the heavy stresses of the masticatory muscles. From this simple diagram, it can be seen that the teeth may receive all the stress of the muscle contraction, the joint remaining strain free.

4. Reflex connections and the antigravity mechanism apply to the specific case at hand.

As there is no provision for significant stress in the joint, it is reasonable to assume that it does not occur, although it is theoretically possible for the muscles to act in such a manner. The reflex connections and the antigravity mechanism prevent the occurrence of destructive forces. It is the temporalis muscle which equilibrates the forces so that the stress in the joint is physiologic in amount and placement. This equilibration of forces by the temporalis muscle is reflexly controlled. The afferent pathway is via the mesencephalic root of the fifth nerve. Fibers of the mesencephalic fifth root are contained in nerves to the muscles of mastication and in the periodontal membranes of the teeth of both maxillary and mandibular arches.[3] It is by this afferent path that the proprioceptive, or muscle, joint and tendon, sense reaches the brain stem. Unconscious sensation of the position of the jaw goes to the mesencephalic fifth nucleus, a sensory nucleus that, through evolution, became incorporated in the substance of the brain. Following the simplest possible reflex arc, the proprioceptive impulses pass to the motor fifth nucleus, where they influence the motor portion of the mandibular nerve in coordinating the muscles of mastication.

The normal "rest" position of the mandible must be thought of as an active process. A constant shower of impulses come to the brain from the tension in the muscles, largely from overcoming the force of gravity. These afferent impulses reflexly control the motor fifth nucleus to maintain the jaw in the "rest" position. By this method, we keep the mandible in position against gravity in the same way that we control other antigravity muscles.

Sherrington[4] says:

On the mouth's seizing a morsel, the mandible, when it has closed, e.g., voluntarily, upon whatever is between the jaws, pressing it against the teeth, by so doing, as is clear from observations of the reflex, produces a stimulus which tends reflexly to

3. Corbin, K. B.: Observations on Peripheral Distribution of Fibers Arising in Mesencephalic Nucleus of Fifth Cranial Nerve. J. Comp. Neurol. 73:153, August 1940.

4. Sherrington, C. S.: Reflexes Elicitable in Cat from Pinna Vibrissae and Jaws. J. Physiol. 51:404, December 1917.

reopen the jaws. That done, the central rebound of the previously inhibited motor neurones sets in and tends to powerfully reclose the jaws again. The reclosure brings into operation once again the jaw-opening stimulus. And so, after being started by a first bite, a rhythmic masticatory reflex tends to keep itself going so long as there is something biteable between the teeth.

Stresses are reflexly controlled. The coordination between all the muscles concerned is so fine that their resultant force is applied where needed in the dental arch. For example, in biting a pencil in the first molar area, the masseters and internal pterygoids could cause stress in the joint, sending impulses to the mesencephalic fifth nucleus. These impulses would reflexly control the motor fifth nucleus to activate the temporalis muscle in such a way as to relieve the stress in the joint. At the same time, the proprioceptive impulse comes to the center from the periodontal membranes of the upper and lower first molars, and these impulses coordinate the muscles so that the resultant force is in the first molar area.

5. How does this concept conflict with existing ideas and how should these ideas be changed?

First and foremost is the "hand-me-down" idea of lever action. A recent writer[5] says, "The condyles (and their glenoid fossae receptacles) constitute adjustable fulcra acting as a lever of the third class." Another[6] says, "The mandible is generally accepted as a lever of the third class."

A lever is a rigid structure turning freely on a fixed point or fulcrum. Third class levers are those in which the resultant power (not individual components) is between the resistance and the fulcrum. If this lever idea were true, and the resultant force were exerted in the region of the muscle insertions, there would be developed in the joints approximately as much stress as in the denture.

We have seen from the gross and histologic structures that there is no provision for heavy stress. On the other hand, the dental arches are so formed as to receive the heavy stresses of the masticatory muscles. When a power acts at the point of resistance, there is no lever action.

A recent statement[7] that the "true centric position is the jaw position in which the mandibular condyles are cradled in the deepest posterior portion of the mandibular fossae of the temporal bones" is a misconception, implying a bone-to-bone contact with an idea of solid support. Gray's "Anatomy"[1] says, "The posterior part of the mandibular fossa is nonarticular and sometimes lodges a portion of the parotid gland."

The posterior part of the capsule is attached to the deep portion of the glenoid fossa. The condyles are "cradled" in a disk of specialized connective tissue. Gray's statement, if he means that there is a definite posterior seating of the condyles in centric relation, is not questioned, but this occurs in soft tissue and neither in bone nor in the deepest posterior part of the fossa.

Contributing to a misconception of lever action is the misunderstanding regarding the direction of component muscle forces. The resultant force applied to the mandible is a complex coordination of actions of the various muscles concerned. The specific action of a specific muscle should be thought of as a component of the complex action of the masticatory organ. The terms "protrusive" and "retrusive" should not be applied to component forces, since

5. Boswell, J. V.: Challenging Current Concepts of Balance in Full Dentures. Illinois D. J. 12:530, December 1943.

6. McCollum, B. B.: Oral Diagnosis. J.A.D.A. 30:1218, August 1, 1943.

7. McLean, D. W.: Diagnosis and Correction of Pathologic Occlusion. J.A.D.A. 29:1204, July 1, 1942.

they have a specific meaning to the dentist.

An article[6] referring to the temporalis muscle says: "Since the anterior fibers run backward, they are said to be protruders of the mandible. . . . The superficial portion of the masseter is said to be elevating and protrusive in action." It has been shown that these fibers are nearly perpendicular to the occlusal plane, which would preclude "protrusive" action.

Giving a false conception and diverging from the idea of the "equilibrating" action of the temporalis muscle is a statement in the same article regarding the muscle's origin:

> Some of its fibers are attached to the great flat cap tendon of the skull, so that it derives anchorage from the top of the head . . . moreover, this cap can be compared to a saddle bag that lies astride the head, carrying on each side in its sheaths the great bellies of the temporal muscles.

The "saddle bag" is the galea aponeurotica, of which Gray's "Anatomy"[7] says, "On either side it gives origin to the auriculares anterior and superior; in this situation, it loses its aponeurotic character, and is continued over the temporal fascia to the zygomatic arch as a layer of laminated areolar tissue."

Morris's "Human Anatomy"[8] speaks of the galea aponeurotica: "Laterally the fascia covering it is continued in a special investment of the auricular muscles, beyond which it is attached to the mastoid process, the zygoma and to the external cervical and masseteric fasciae."

Cunningham's "Anatomy"[9] says, "Laterally, it gives origin to the superior and anterior auricular muscles, and is continued downward as a thin sheet that blends with the temporal fascia a short distance above the zygomatic arch."

Conclusions and Clinical Implications

It is not within the scope of this paper to go into the complete clinical implications of the reflex controlled nonlever action of the jaw. It is evident that an accurate concept of mandibular function is necessary to any rational dental treatment. Every dental restoration, prosthesis, orthodontic procedure or treatment of periodontoclasia must be accomplished with a knowledge of and in harmony with the working of the masticatory organ as a whole.

Heavy stress occurs in the denture area only during isometric contraction of the muscles. In clinical practice, a definite centric stop must be provided so that destructive stress will not occur. The anatomy and histology of the temporomandibular joints definitely indicate that they are not stress-bearing areas. The mandible is not a Class III lever. The dental arches are intended to bear all the heavy stress. Inclined planes which do not provide a definite centric stop are not in harmony in function with the masticatory organ and are responsible for joint and periodontal disease.

There is great need for a better understanding of centric relationship. More harm than good can be caused by the dental procedure that creates inclined planes in a relationship where intercuspation should occur.

Stresses in the mandible are regulated by a positional and a masticatory reflex. Many pathologic processes in the joints and investing structures of the teeth encountered in everyday practice may be caused by abnormal reflexes. Conditions that cause abnormal reflex activity should be known, so that the dentist shall not create them himself, and, when encountered, they may be corrected. Eccentric

8. Morris, Henry: Human Anatomy. Complete Systematic Treatise. Ed. 10 (edited by J. Parsons Schaeffer). Philadelphia: Blakiston Company, 1942.

9. Cunningham, D. S.: Textbook of Anatomy. Ed. 7 (edited by J. C. Brash and E. B. Jamieson). London: Oxford University Press, 1937.

intercuspation, centric interference and psychologic influences may be the cause of abnormal reflexes, clinically evident as the result of bruxism and other biting habits.

The disk is not composed of fibrocartilage, which is known not to be repairable. It is composed of a specialized connective tissue. Repair of lesions of the disk can occur if the conditions responsible for the pathologic process are corrected. Armed with a knowledge of the working of the masticatory organ, the general practitioner may treat the cases of clicking, popping and painful joints by simple correction of the causes of abnormal reflexes and stresses.

This concept must not be interpreted as minimizing demands as to definite guides to mandibular movements.

Summary

1. The action of the jaw is a reflex controlled nonlever action.

2. The anatomic and histologic structure of the temporomandibular joint shows that it is not meant to bear heavy stresses.

3. The jaw is not a lever of the third class. The muscles of mastication are so placed that the resultant force of their actions can be borne by the teeth, the joints being left free from traumatizing stress.

4. Heavy stress is developed in the denture only during isometric muscular contraction.

5. The normal stresses in the mandible are regulated by a positional and a masticatory reflex activity in the fifth cranial nerve, in its motor and mesencephalic nuclei.

6. The disk is not fibrocartilage but a specialized connective tissue which is capable of repair.—*1165 Centinella Boulevard.*

DENTISTRY AT CABANATUAN WAR PRISON CAMP NO. 1 IN THE PHILIPPINE ISLANDS

Albert Fields,* D.D.S., Fort Sam Houston, Texas

After the fall of Bataan in April 1942, and the fall of Fort Mills, Corregidor, in May 1942, the Japanese found themselves with about 18,000 American prisoners of war and probably 80,000 Filipinos. Most of the prisoners taken on Bataan, both Americans and Filipinos, were required to make the death march from Bataan to San Fernando, Pampanga, and then by train to Camp O'Donnell, about forty miles north.

The American prisoners taken on Corregidor were transported across Manila Bay in boats and were required to wade ashore in neck-deep water, landing on the beach in south Manila. The Americans were then marched north on Dewey Boulevard to the old Spanish Bilibid prison in Manila.

Organization of Camp

On June 1, 1942, the Japanese started concentrating the American prisoners at a former Filipino army training camp, approximately nine kilometers east of the city of Cabanatuan, Nueva Ecija. This

*Colonel (DC) AUS, Brooke General Hospital, Convalescent Section.

camp was later to be known as the Cabanatuan War Prison Camp No. 1 of the Philippine Islands. It became the most important American prisoner-of-war camp of the Philippines. From this camp, men were sent out on various work projects throughout the archipelago, and they were returned for rest and hospitalization as they became too ill or weakened on the various assigned jobs or as they completed their work projects. The camp reached its maximum number of personnel, approximately 7,000 men, about November 1, 1942. Owing to the turnover of personnel in the camp, there was probably a total of 12,000 prisoners at the camp during its three years of existence.

The Japanese roughly divided the camp into four groups, for purposes of administration, namely: Group I, Group II, Group III and the hospital. The hospital was assigned the west side of the camp and the three groups the east side, while the Japanese garrison, the camp headquarters, the electric power station, the pump house, the garages and other miscellaneous installations occupied the middle third of the camp. The barbed wire inclosure of the camp was approximately three-fourths of a mile square.

The Japanese sent personnel and patients to the camp at the rate of about 400 to 500 a day, even before the camp was organized, and the majority of them came from Camp O'Donnell where the death rate was very high. More than 1,500 Americans died there during April and May of 1942.

All camp work had to be performed by the Americans. It was difficult to find men willing and able to cook, chop wood, carry water, bury the dead or perform any of the essential routine duties of the camp. The Japanese added to this unhappy state of affairs by invoking many harsh rules and demanding endless "bangoes" roll calls, to arrive at the correct number of men in camp and patients in the hospital. It was most difficult to secure an accurate count by name and number, since many of the men were too ill to give their names. Some men died without being identified. The Japanese selected the American camp officials—commanding officer, executive officer, adjutant, quartermaster, surgeon and other key positions—often without regard to rank or seniority. The camp surgeon's office was organized regularly with the senior medical officer as camp surgeon, a medical executive officer, a camp medical inspector, a medical adjutant, a dental assistant and a veterinary assistant.

Medical Department Personnel and Facilities

In general, the medical personnel which had been with the combat units in Bataan, Camp O'Donnell and Corregidor were directed to the groups previously referred to, and they established dispensaries and clinics. The original medical department personnel and detachment of General Hospital No. 2, Bataan, staffed the camp hospital.

The hospital had about fifty habitable buildings. The ward buildings, double tiered, were of bamboo, swalli and nipa construction, and they were approximately twenty by sixty feet in size. The wards were built originally to shelter seventy Filipino trainees. More than one hundred patients frequently were housed in these unsuitable buildings, which had no running water, sewer or electric lights.

For a number of weeks after the Americans went to this camp, the per capita ration of water was one canteen a day, which was secured after standing in line. A person was able to bathe only by standing in the rain or under the eaves of the buildings when it rained.

Housing conditions were the same throughout the camp, and the hospital was not the exception in being overcrowded and without sanitary installations.

Food Service

Providing food was a continuous problem, and meals were irregular because of failure of the Japanese to issue food at the proper time, lack of water, lack of wood and inadequate equipment for the preparation of the food.

Basic Food.—The basic item of food was rice, which was served daily with all three meals. In the beginning, the American cooks did not know how to prepare the rice properly, and a number of months passed before the process of cooking rice was standardized, so that the rice was palatable and nutritious. Breakfast consisted of "lugao" (rice), salt, a little "purico," cocoanut oil when available, and water sufficient to make a gruel. Steamed rice was the basis of the other two meals per day.

Cooking of Food.—In the cooking of rice, large cast-iron caldrons were used. These had smooth bottoms and were three to four feet across the top and about eighteen inches deep. Heavy wooden paddles were used to stir the cooking rice from the bottom of the vessel. These caldrons were supported on adobe bricked-up stoves about four feet wide, eight feet long and three feet high. The caldrons were also used in the cooking of practically all other items of food, such as vegetables, stews, etc.

Baking.—Rice, in some instances, was ground into flour, and corn was used to make corn meal. The baking was accomplished in "quan" stoves, which were about the same size and type as the adobe stoves described above, except that the tops generally were constructed of iron or sheet metal so that foods could be fried or boiled in small individual containers. The oven was constructed in the rear section of the stove, and it was made of one or two oil drums which were built into the wall in such a manner that heat passed around them. The American cooks became very proficient in the use of these crudely constructed ovens, and they made much use of the baking facilities.

Red Cross Food and Supplies

The first shipment of Red Cross food and supplies was received in Cabanatuan Prison Camp late in November 1942. The food was put up in both individual packages and case goods. The individual package weighed approximately nine pounds and contained about seventeen items of food.

The case foods consisted of dehydrated fruits, vegetables, some canned goods and sugar. The individual Red Cross packages were issued to the personnel unbroken. The case foods were retained in the messes and prepared as a supplement to the Japanese issue.

In addition to the food, the Red Cross supplies contained quinine, blood plasma, dysentery medicines, sulfa drugs, vitamins, biologicals, surgical supplies and some surgical instruments.

The effect of the Red Cross supplies was magical. The death rate for December 1942 was only one-half of that for November; for January 1943 it was only half of that for December 1942. The decline in the death rate continued each month, until the rate was about normal as compared with the rate for a similar group of personnel. The highest number of deaths in any one month was about 700, while forty-four was the highest number of deaths in one day. There were approximately 5,500 men in camp at this time.

Mail and Communications

At no time were personnel allowed to write letters to relatives or to conduct other correspondence. Imperial Japanese Army Red Cross cards, which were limited to twenty-five word messages, were prepared and mailed every two months. This service began in November 1942. Each prisoner was allowed to send one card to his immediate family. The messages were circumscribed by many

restrictions. All messages had to be typewritten, with only the signature in the prisoner's own handwriting.

A few radiograms were allowed to be sent from time to time. Each organization in the camp was granted the privilege of sending a given number of messages, and the number of radiograms was based on the strength of the organization.

Prior to the beginning of 1944, very few letters or messages were received in camp. It seemed that most of the messages received were death messages, which the Japanese allowed to come through. Early in 1944, many thousands (30,000 to 40,000) of letters were received at the Japanese headquarters in the camp. The Japanese withheld most of these letters and delivered only a few at a time. Although each letter bore the Japanese censorship stamp, which was placed prior to the arrival at the camp, it was claimed that each had to be recensored before delivery. As a means of mass punishment for some infraction of Japanese rules, no mail would be delivered for some time.

In the spring of 1944, the only individual packages which the families of the prisoners were allowed to send arrived in camp. The majority of these packages were standard Red Cross packages, containing a few items of wearing apparel, games and a little food, such as cheese, raisins, prunes, malted milk and vitamins. The Japanese required that all of these packages be opened in their presence, and, with the exception of scissors, razors, cigaret lighters, etc., the owners were permitted to retain all of the contents.

Dental Service Established

Dental Materials Carried into Camp.—Practically every dental officer carried into camp some dental instruments and supplies, which were intended for emergency dental treatment. These instruments and supplies represented what the dental officer had available at the time that he was ordered to proceed to Cabanatuan, or what he was physically able to carry, or what was left after one or more "shakedown" inspections which were made by the Japanese along the route to the camp.

Organization of Dental Service.—The dental officers, having arrived in camp, were asked to deposit all of their dental instruments and supplies in a pool, and in this manner sufficient materials were assembled to establish a dental service for the command. With the exception of instruments, forceps and supplies which were carried into camp, there were no field (dental) engines, chairs or laboratory equipment available.

Crude wooden dental chairs were constructed, and a variety of shelves and boxes were used as clinic furniture. Thus the dental service got under way simultaneously with the organization of the camp, and it was always possible to secure emergency dental treatment.

Conservation of the teeth was stressed from the beginning. In the first few months of the camp, thousands of temporary restorations, consisting of zinc oxide-eugenol cement, were inserted into cavities which had been excavated by hand instruments. Zinc oxide-eugenol cement was used extensively since the more permanent filling materials were not available generally.

The primary objective in cavity preparation was the removal of all decay and the conservation of all possible tooth structure to permit the most satisfactory restoration with the least amount of filling material. Extension for prevention, therefore, was a secondary consideration in the interest of conservation of materials.

The first dental field equipment, comparable to the M.D. Chest No. 60, was received in August 1942, and consisted of a field chair, a foot engine and some supplies. This field equipment was rationed to the camp dental clinic for four

days a week and to the hospital for three days a week.

In July 1942, the equipment and remaining supplies of the former General Hospitals Nos. 1 and 2, in Bataan, were removed to Camp O'Donnell. The equipment, which consisted of six field units in serviceable condition, was received from Camp O'Donnell early in January 1943.

The Japanese required the hospital to maintain a dysentery section completely separated from the remainder of the hospital. It was necessary, therefore, to maintain two dental clinics in the hospital area throughout the entire period of the camp. So far as possible, only dental officers who were classed as chronic arrested dysentery patients operated in the dysentery clinic of the hospital. Later, it was necessary to open a special dental clinic in the group section of the camp that had been redesignated as the chronic dysentery group No. 3.

Duties of Dental Officers.—Obviously, with the limited facilities and materials available, all of the dental officers could not be employed in the dental clinics continuously. Neither could all of the medical, veterinary and medical administrative officers be employed in their usual capacities in the camp.

The Japanese required all personnel to work, and the medical department officers, like all others, frequently worked on the farm, raising rice, corn and other vegetables. They worked on the roads, cut grass, guarded livestock, cut wood, built fences and repaired buildings. These duties were in addition to carrying on all medical department activities in the best possible manner under the most adverse circumstances imaginable. Dental officers were frequently assigned to administrative jobs, as mess officers or sanitary inspectors, and they also assisted in nursing and feeding the sick.

Medical Department Records.—Camp medical department records, because of the shortage of paper, were developed using the labels from six-ounce evaporated milk cans. The Japanese issued a limited amount of American evaporated milk daily, the milk having been confiscated in the capture of Manila. The labels were slit and unrolled, and the under side of the label, being blank, was used for the various records.

Dental Amalgam.—Since the dental service was continually faced with a shortage of amalgam, a plan for the making of amalgam was adopted. Filipino silver coinage or other sterling silver objects were secured from the personnel of the camp, and such materials were paid for out of the welfare fund maintained in the camp. The silver was filed with an ordinary file, and the filings then were sifted through gauze to eliminate the larger pieces. The larger filings and the ends of the filed pieces were fused and refiled, and by this process little silver was wasted. The filings were used by adding them to the supply of commercial alloy (up to 50 per cent). A number of restorations also were made with the filings without the addition of alloy. The fillings made in this manner were very similar to those made from ordinary alloy. However, the surface of the filling was rough and required polishing. I examined some of the restorations, which had been in use for more than two years, and they were functioning satisfactorily.

Mercury.—The camp medical supply had a large number of bichloride tablets which were not needed. It was decided, therefore, to recover the mercury from these tablets for the dental needs. A satisfactory method for the recovery of the mercury was to place the tablets in a 50 per cent solution of hydrochloric acid. Aluminum, which was secured by cutting mess kit lids into small pieces, was used as a catalytic agent. The whole mass was then heated, and in this manner the free mercury was recovered. The Red Cross supplies did not contain alloy or mercury.

Sterilization.—For the first eighteen

months in camp, sterilization was limited largely to washing the instruments in native soap and water. Electricity was used only for illumination of the camp at night. Methyl alcohol was issued in such small quantities that it could not be used. This was also true of kerosene and gasoline. After the arrival of the second shipment of Red Cross supplies, in November 1943, the instruments, in addition to being washed in soap and water, were immersed in an antiseptic solution. No case of infection developed, so far as it is known, from contaminated instruments or unsterilized gauze and cotton. Wounds of the mouth, after extractions and other surgery, seemed to heal in the usual time and manner.

Cords for Dental Foot Engines.—All of the dental field foot engines required a cord fifteen feet, four inches in length. The supply of cords of this size became exhausted, and securing a substitute for this inexpensive item became one of the most difficult problems. All types of materials were tried, including copper wire and carabao hide. Electric engine belts also were spliced and tried. However, even though guide wires were improvised, the knot or splice in the belt would "jump the track," and the cord could not be kept on the wheels. Finally, an "endless belt" was made by using ordinary wrapping twine cotton string. A three-strand "rope," approximately eighteen feet long, was constructed so that it would not tend to twist and knot when allowed to slack. It was then coated with beeswax to give it strength and to make it smooth and slick, so that it would run in the grooves of the pulleys. This finish also prevented it from ravelling. The splice was carried over or laid a distance of approximately three feet or more, so that joining of the individual strands was approximately a foot or more apart. The ends of the individual strands were then properly "tucked" to prevent ravelling. A cord thus constructed runs smoothly throughout its length, pedals easily and is very durable. Abaca—manila hemp fibers twisted into a small cord and then made into a three-strand rope—can also be used.

Procaine.—Procaine and epinephrine cartridges kept very well during the three years of storage. A large supply was taken to Bataan when Manila was evacuated. Without protection from the tropical heat during this interval, at least 50 per cent of the remaining stock of cartridges did not show discoloration.

The stock of procaine and epinephrine tablets did not keep as well as the cartridges, and most of the tablets had changed to a brown or dark brown color.

Dental Films.—The camp had a portable x-ray unit, which remained in a serviceable condition. X-ray exposures could be made only at night when the camp electric plant was in operation. The supply of dental films would probably have been sufficient for a limited x-ray service until the close of camp, if the films had not deteriorated. The regular films were usable approximately a year longer than the fast films.

The x-ray department reserved for extreme emergencies a few films about eight by ten inches in size, packed for export shipment. A few dental exposures were made by cutting and wrapping these films to the approximate size of ordinary dental films. These were used in fracture cases, mandibular impactions and other special cases. They would have been of little value for small detail examinations owing to foggy deterioration.

No x-ray supplies of any kind were received in the Red Cross shipments.

Dental Handpieces.—The dental foot engines were equipped with a nondescript set of handpieces, and from the time of the arrival of the equipment it was necessary to be continually repairing and changing the parts of the handpieces. In the interest of conserva-

tion, the handpiece was not permitted to be used with pumice in the polishing of teeth. However, all of the angle handpieces finally became unserviceable, and it was necessary to apply for replacements from the "outside."

At least three angle handpieces were received, and it was reported reliably that one of these cost 900 pesos, at a time when the Japanese invasion money still possessed considerable value in Manila. This is submitted as evidence of the assistance that was given to the camp by the Filipinos.

Dental Burs and Mounted Stones.—Included in the many supplies that were brought to Bataan from Manila was a large stock of burs and mounted carborundum stones. This stock of burs and stones was sufficient to last throughout the entire period of the camp. The stock of some of the more commonly used burs was soon exhausted, but the selection was sufficiently large so that a suitable substitution could be made. No burs or mounted stones were received in the shipments of Red Cross supplies.

Prosthetic Dentistry.—No replacement of teeth by bridges or dentures was possible, owing to lack of laboratory equipment and supplies. The lack of laboratory equipment and supplies was a severe handicap. Many bridges, crowns and dentures were broken or lost during the campaign. As time went on, many extractions had to be made, and dentures became unserviceable through long use. The need for this service increased continually, as patients in poor physical condition lost weight and as their oral tissues changed.

In some instances, partial gold dentures were confiscated by the Japanese, and other dentures were deliberately broken by them when patients were discovered wearing these appliances.

Various oral manifestations of the deficiency diseases presented themselves, the result of pellagra, beriberi (wet and dry types) and scurvy. Avitaminosis was common and it was impossible to differentiate between one vitamin deficiency and another.

Unless the case presented definite symptoms of a single form of stomatitis, all of the conditions and manifestations of this character were given the inclusive term of "nutritional stomatitis."

Vincent's infection was rarely seen, and it was not encountered as frequently as under normal conditions.

Conduct of the Dental Service

As far as possible, the dental service was conducted as it is in any American army camp. The dental officers were rotated to the clinics for varying periods of time, so that all were given as much time as possible in their professional work. Frequent dental surveys were made of the personnel. Many of the surveys were made at the barracks and wards; a field dental outfit was taken to the building and the patients were called later in accordance with their recorded dental needs.

Inasmuch as all dental treatment had to be done by daylight, appointments were arranged during the most favorable hours for the patients and the operators. Schedules were arranged for the noon hours and the rest period, which lasted until 2 or 2:30 p.m., depending on the season. Japanese holidays and Sundays (when observed) were utilized for dental treatment. Routine dental treatment generally was not allowed to interfere with the regular camp work. Patients in the hospital, dental emergency cases and those persons reporting on the scheduled sick calls were the exceptions.

Approximately 10 per cent of the personnel had toothbrushes during most of the period in camp. In order to compensate for the lack of brushes, the dental service rendered more prophylactic treatments (removal of calculus) than are

accomplished ordinarily. Men were encouraged to come in for this service at any time and, as a result, hundreds of sittings were given for this treatment alone. As previously stated, the dental engines were not used to polish the teeth, in order to preserve the handpieces.

On occasions when details were selected by the Japanese to leave the camp, the men selected were reexamined and all possible dental service was completed before their departure. More than 50,000 sittings (appointments) were recorded. The dental service was fortunate in having sufficient anesthetics, dental medicines, supplies and instruments from the beginning until the close of the camp, so that personnel received dental treatment to the full extent of the resources available.—*Brooke General Hospital.*

THE PROGNOSIS OF MARGINAL GINGIVAL ATROPHY

Benjamin Tishler, D.M.D., Boston

The principal complaints of patients who want periodontal treatment are either bleeding gums, which condition is often spontaneous, or a bad taste in the mouth on arising in the morning, or both. The first is caused by poor gingival capillary circulation and the latter by gingival suppuration. Marginal gingival atrophy is usually the etiologic factor of both. The diagnosis of this disturbance is comparatively simple but the prognosis is more complicated and for this reason not well understood.

Diagnosis is frequently neglected in the early stages of the disease when successful treatment is not difficult, even before morphologic and color changes are evident, although hemorrhage is not unusual. Some practitioners believe that the gingivae of some patients will always bleed on touch, in other words, that it is a normal condition. This conception is erroneous because healthy gingival tissue will never bleed unless injured.

The reason why a prognosis of marginal gingival atrophy is more complicated than its diagnosis is the necessity for knowledge of cell resistance and occlusion, of the amount of destruction of the alveolar process, pericementum and cementum and of the patient's cooperation. Because these factors require study, treatment will be unsuccessful regardless of the method employed if they are not understood, even though the practitioner possesses operative skill. This lack of understanding is unquestionably a weakness of many general practitioners and, as a consequence, teeth are extracted unnecessarily. This deprives patients of many years of natural function, and even though dentures are supplied later, no artificial tooth can give service equal to a natural one. Repeated failures traceable to lack of knowledge are responsible in great part for the scepticism which is held by some members of our profession regarding the success of treatment.

Cell Resistance

Cell resistance is the most fundamental component that should be taken into consideration in the prognosis of any

bodily disturbance. The following opinion of Zinsser concerns bacterial infection and is presented because it has a relative value in marginal gingival atrophy, as will be shown, although infection is not a primary influence in this disease.

Zinsser[1] stated that infectious disease is the result of two factors: the pathogenic power of the micro-organism and the resistance of the patient; and that a micro-organism may be capable of causing disease in one case and not in another. On the other hand, a person may resist the effect of bacterial action or be highly susceptible, depending entirely on the environment. Zinsser felt that resistance, immunity and susceptibility are terms that never should be discussed without considering all modifying conditions.

Cell resistance is the reaction to the disturbing influences which are responsible for the disintegration of the tissues. Dental practitioners are aware that there is a wide variation in the extent of marginal gingival atrophy in different persons. This is plainly indicated when the age of the patient is considered although age bears no relation to the rate of progress of the disturbing symptoms. Just as cancer may develop slowly or rapidly, there is a slow or rapid breakdown of the periodontal cells of different persons. Many young patients who are affected by marginal gingival atrophy develop advanced lesions while older patients do not; in some cases the lesions are often very slight in late middle age.

One would naturally suppose that if periodontoclasia had existed for many years, and in my opinion the inception of this disease is usually before the age of 20, the periodontal cells of a patient 50 years of age would show marked lesions when compared with those of patients 25 or 30 years old. But this is not so. Because of metabolic changes of which we have no knowledge, there is an acceleration of the catabolic process in some persons and a retardation in others.

Lesions of marginal gingival atrophy which involve the destruction of half of the bony support in young persons offer a poorer prognosis than identical lesions found in patients of late middle age.

Occlusion

Since the American Academy of Periodontology was organized in 1914, its members, through their writing, talks and clinics, have emphasized the fact that a poorly functioning occlusion is a contributing cause in cases of periodontoclasia, although not a primary one. There is also a wide divergence of sequences in such cases. Periodontists frequently see mature patients whose occlusion is very poor but whose periodontal tissues are only moderately, and, in some cases, never affected. The only explanation is cell resistance but it is not a satisfactory one because it is inconclusive and is merely a statement of fact rather than an etiologic explanation. When a case of poorly functioning occlusion is seen, such as retrusion of the mandible, which has resulted in a marked bone loss and mobility of the mandibular incisors, the prognosis is poor, regardless of the patient's age, because occlusal grinding to relieve it will not suffice to bring about a condition of health and opening the bite has been found to be a doubtful procedure. However, in many cases in which the abnormality is not too pronounced, judicious grinding of the areas which are in heavy contact, in addition to other treatment, will affect the prognosis favorably.

Alveolar Process

If an operator possesses sufficient operative skill and thoroughly understands the treatment of periodontal disease, he may assume that the prognosis is favorable if no more than half of the alveolar bone is lost in cases of marginal gingival

1. Zinsser, Hans: Infection and Resistance. New York: Macmillan Co., 1923. Third Edition, p. 58.

atrophy, provided that the areas of unusually heavy occlusal contact are relieved by proper grinding. Grinding an occlusion, however, should be slowly and carefully done. Sometimes two or more appointments of an hour each are required to relieve a locked occlusion. Bone regeneration and an absence of mobility have been observed after such treatment.

Cementum

The influence of the cementum in periodontoclasia is not very well known although it has a direct effect on prognosis. When roentgenograms show teeth with short, pointed roots around which the alveolar process has broken down, it is safe to conclude that the prognosis is poor; the same is true of narrow roots which are surrounded by a thin cemental layer. On the other hand, teeth with long, well-shaped roots with a heavy cemental layer offer a favorable prognosis. The interpretation of roentgenograms of marginal atrophy is a simple matter because the loss of bone is more evident than in cases of diffuse alveolar atrophy.

Patient Cooperation

An element which directly affects prognosis is the cooperation of the patient in maintaining gingival health after the operator has completed treatment of the case. Since this cannot be definitely ascertained before treatment, it is possible to make only a general prognosis at the first visit of the patient. Because the cause of periodontal pathosis has yet to be definitely established, the disease cannot be said to be cured after treatment even though regeneration of the tissues takes place, for if the patient becomes careless in the use of the toothbrush and interdental stimulator, recurrence of the catabolic changes will result by which cell resistance is weakened and overcome.

I have long been of the opinion that the periodontal cells of some persons are predisposed to the development of periodontosis and that unfavorable tissue changes will result under certain conditions which are unknown at present. The periodontist, therefore, can give only a generalized opinion regarding the permanent result of treatment even after periodic examination of the tissues. In my experience, some patients become lax after a while and depend too much on the operator's treatment and not enough on their own. These patients must be constantly warned. They must be impressed with the fact that constant, faithful care of the mouth, as demonstrated at the first appointment, is the sole means of assuring the permanent success of treatment. A favorable prognosis could probably be made for patients who cooperate fully in this regard.—*358 Commonwealth Avenue.*

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Animal Teeth.—No true teeth are found in creatures lower than the vertebrates, and not all the vertebrates possess them. In the great kingdom of the modern birds there are no teeth, though some fossil birds exhibit them and a very few embryonic teeth are found in living varieties. When tooth-like parts are observed in invertebrate forms, these are not true teeth—that is, they do not arise in the embryo in the same manner that all vertebrate teeth do. Nor are they similar in structure, though they usually perform a similar function. H. T. Thompson, in his discussion of invertebrate teeth, reminds us that in the lower form, objects, particularly food, are seized by other organs—a suctorial mouth, tentacles, horny jaws, or modified limbs—while mastication is done internally.—*Your Teeth: Their Past, Present and Probable Future. Peter J. Brekhus. Minneapolis: University of Minnesota Press, 1941.*

PRELIMINARY REPORT ON PENICILLIN IN ROOT THERAPY

George G. Stewart,* D.D.S., A.B., Los Angeles

MUCH has been learned and written about penicillin in the short time that it has been available for dental use. Its employment in Vincent's infection and other oral lesions has been studied rather widely. Its use in root therapy, however, has not been fully explored.

This report is based on the experience and knowledge gained from the first 112 teeth that I treated. Further studies are in progress to determine the effectiveness of this antibiotic in root therapy.

Procedure

The tooth to be treated was first isolated, dried and sterilized. At the first sitting, all of the pulp tissue was removed. The canal was reamed and filed to remove necrotic tissue and soft dentin. Drainage was established when necessary and the canal and periapical tissues were syringed with warm physiologic saline solution to remove all débris. The canal was then dried and the penicillin solution was forced up into the tooth by means of a syringe. A pledget of cotton was placed in the pulp chamber to act as a reservoir and to prevent the sealing agent from entering the canal. The sealing agent used was a thick mixture of zinc oxide and eugenol.

On subsequent visits the tooth was again isolated, dried and sterilized; the seal was removed, the tooth syringed with normal saline solution and, when necessary, reamed and filed again. If filing were again required, the canal was again flushed and dried before the penicillin solution was sealed into the tooth.

This procedure I have termed a "tooth treatment" in the presentation of the sample cases. These tooth treatments were continued until the tooth was asymptomatic. At that time, cultures were taken to determine whether or not bacteria were still present in the canal. If the culture was negative, the canal was filled. The method of filling the canal was that described by Louis I. Grossman.[1]

The number of units of penicillin used varied with the individual case. The solutions were made up as 20,000, 40,000 or 80,000 units per cubic centimeter. Solvents were either sterile water or sterile physiologic saline solution. The solutions were prepared as needed and kept on ice. Only those cases that have had an adequate period of checkup are presented here as sample cases.

Necrotic or Putrescent Pulp

Twenty-eight cases were treated.

Case 1. The patient was a white man, aged 18, whose case was discovered during a routine dental examination. The maxillary right central incisor was discolored. The patient gave a history of trauma. At the age of 12 he had fallen and bumped his tooth while playing. The tooth had become pink, indicating hemorrhage. Caries developed and a large cavity was present on the mesial surface of the tooth.

A roentgenogram (Fig. 1, left) showed no periapical involvement. On August 28,

*Captain (DC) ASF, Regional Hospital, Fort McClellan, Ala.

1. Grossman, L. I.: Evaluation of Antibiotic Agents for Root Canal Treatment. New York J. Den. 15:233, June-July 1945.

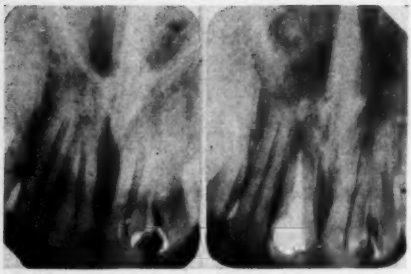

Fig. 1.—Left: Case before treatment, August 28, 1945. Right: Case at final checkup, October 5, 1945. The tooth is still asymptomatic

the tooth was opened from the lingual surface and found to be highly putrescent. After treatment, 5,000 units of penicillin was injected into the tooth and the tooth was sealed. On August 29, the tooth was asymptomatic. A culture was negative and the tooth was again treated with 10,000 units of penicillin as a precautionary measure.

On September 4, the tooth was still asymptomatic and the root canal was filled. By October 5, the tooth had been asymptomatic since filling and roentgenographic findings at that time proved to be negative (Fig. 1, right).

Case 2. The patient was a colored man, aged 18, who reported that his front teeth were very sensitive to heat and cold and slightly sensitive to pressure.

Upon examination, deep cavities were discovered on the mesial surfaces of both the right and left maxillary central incisors. A roentgenogram (Fig. 2, left) showed a slight thickening of the periodontal membrane of the left central incisor. Caries had extended to the pulp. On September 19, the canals of both teeth were opened and found to be necrotic. The pulp of the left central incisor had undergone complete liquefactive necrosis. Both teeth were treated and 5,000 units of penicillin was sealed into each. On September 20, the teeth were asymptomatic. Each tooth was again treated and 10,000 units of penicillin was used. On September 25, the culture was negative and the root canals were filled.

On October 27, the teeth were still asymptomatic and roentgenographic findings were negative (Fig. 2, right).

Acute Abscess

Fifteen cases were treated.

Case 3. The patient was a white man, aged 18, who entered the clinic as an emergency case on September 10, complaining of acute pain in the maxillary left central incisor. The tooth was tender to pressure and swelling extended over the cheek and up to the left eye. A deep silicate restoration had been placed in the tooth on September 6 (Fig. 3, left). The tooth had been constantly painful since that time.

The canal was opened for drainage and immediate relief ensued. After treatment, 5,000 units of penicillin was placed in the tooth. To allow for drainage, only cotton was used to block the pulp chamber. The swelling was markedly reduced by September 11 and the patient had been comfortable all evening. The tooth was again treated and 5,000 units of penicillin was sealed into it. By September 13, the tooth was asymptomatic and all the swelling was gone. The tooth was again treated and another 5,000 units of penicillin was sealed into it. On September 17, the tooth was still asymptomatic, a culture was negative and the root canal was filled.

The tooth was still asymptomatic on October 18 and roentgenographic findings were negative (Fig. 3, right).

Case 4. The patient was a white man, aged 19, who entered the clinic as an emergency case. There was a tender swelling of the lip over the maxillary right central incisor (Fig. 4, left). The tooth was extremely tender to percussion. In 1944, a deep silicate restoration had been placed in the tooth. The tooth

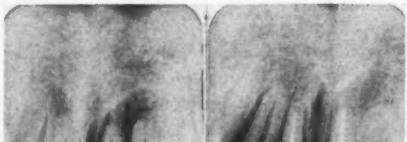

Fig. 2.—Left: Case before treatment, September 19, 1945. Right: Case at final checkup, October 27, 1945. The tooth is still asymptomatic

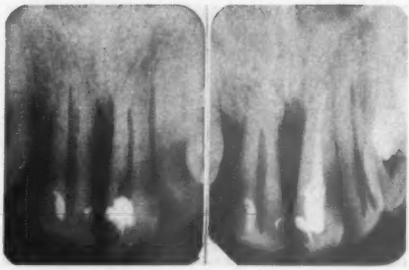

Fig. 3.—Left: Case before treatment, September 10, 1945. Right: Case at final checkup, October 18, 1945. The tooth is still asymptomatic

became sensitive on August 24 and had become progressively more tender until the patient reported to the clinic.

On August 27, the tooth was opened and found to be necrotic. After treatment, 10,000 units of penicillin was placed in the tooth. To allow for drainage, only cotton was used to seal the tooth. On August 28, the swelling had almost completely subsided, the canal was odorless and the tooth was no longer sensitive to percussion. The tooth was treated again and 10,000 units of penicillin was sealed into the tooth with zinc oxide and eugenol. By August 29, the tooth was asymptomatic and a culture was negative. Treatment was repeated as a precautionary measure on August 30. The root canal was filled on September 5.

On October 5, the tooth was asymptomatic and the roentgenographic findings were negative (Fig. 4, right).

Chronic Abscess

Fifty-five cases were treated.

Case 5. The patient was a white man, aged 25. The maxillary central incisor had been cracked when the patient was a child. Roentgenographic study showed incomplete development of the tooth, indicating that the fracture took place at the approximate age of 9. From that time on, the patient noticed gum boils over the tooth. These would rise, break and disappear, leaving a foul taste in his mouth.

Upon examination, the tooth was found to be very loose. It was tender to pressure and a creamy pus would exude upon pressure to the gum. The roentgenogram (Fig. 5, left) showed a large area extending to the maxillary left lateral incisor. An incision was made in the gingiva to establish drainage. The tooth was opened and the canal was cleaned by pumping hot saline solution into it. The tooth was treated and creosote was placed in the canal in addition to cotton which was lightly inserted.

No improvement was evident on May 26. The tooth was again treated and Azochloramid was used as the medicament. On May 28, no change was evident. The tooth was again treated and sulfathiazole washes were used. On May 31 the patient was again treated with sulfathiazole; on June 1 with creosote; on June 4 with Azochloramid; on June 5, 19, 20, 21 and 22 with creosote. After twelve treatments there was no improvement.

On June 22, I received permission to obtain and use penicillin for this case. The tooth was treated on June 23 and 5,000 units of penicillin was introduced by way of the canal. On June 25, there was a marked improvement; the tenderness was gone and there was practically no putrefaction. The tooth was again treated and 5,000 units of penicillin was again sealed into it. On June 26, the tooth was much firmer; there was no pain or putrefaction present, and the fistula had closed. The tooth was again treated and this time 10,000 units of penicillin was forced through it.

When the patient returned on June 27, the root canal was filled and root amputation performed (Fig. 5, center). (If I had known the effectiveness of penicillin at this time, root amputation would probably not have

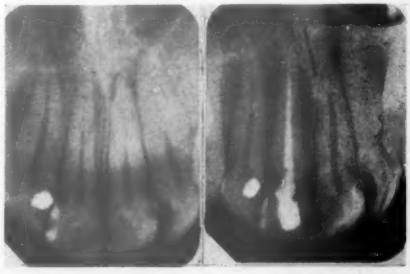

Fig. 4.—Left: Case before treatment, August 27, 1945. Right: Case at final checkup, October 5, 1945. The tooth is still asymptomatic

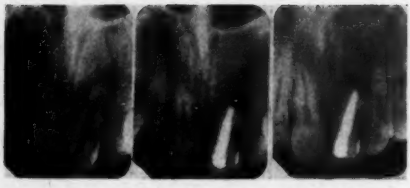

Fig. 5.—Left: Case before treatment, May 23, 1945. Center: Case after completion of treatment, June 27, 1945. Right: Case at final checkup, October 17, 1945. The tooth is still asymptomatic

been necessary.) On June 28, the patient reported that he had suffered no discomfort. The stitches were removed on July 2.

Roentgenographic checkups were made on September 20 and October 17. The tooth was asymptomatic and almost all of the lost bone had been replaced (Fig. 5, right).

Case 6. The patient was a white man, aged 18. In September 1944, the patient had had a severe pain in the maxillary left lateral incisor. His civilian dentist had cleaned out the caries and placed a temporary filling in the tooth. The patient did not return for further treatment and in April 1945, he noticed the first gum boil. The tooth became sensitive to pressure and gum boils would appear, rupture and disappear.

On July 9, the patient reported to the clinic with a gum boil over the tooth. Roentgenograms showed a large diffuse area over the tooth (Fig. 6, left). The tooth was treated, 5,000 units of penicillin solution was sealed into it, and 10,000 units of penicillin in procaine was injected into the area through the fistula.

The fistula had closed and the tooth was asymptomatic on July 10 when it was again treated with 2,500 units of penicillin. This was sealed into the canal and 10,000 units of penicillin in procaine was injected into the gum. The root canal was filled on July 11 (Fig. 6, center).

Roentgenographic checkups were made on September 9 and October 5. The tooth had remained asymptomatic and a roentgenogram (Fig. 6, right) showed that regeneration of the lost bone was almost complete.

Case 7. The patient was a colored man, aged 18, whose case was discovered during a routine oral examination. The maxillary right central incisor was involved. The patient said that at the age of 9 he had cracked his tooth while playing. Since then he had had an unpleasant taste in his mouth and the tooth had been discolored.

Upon examination it was found that one-third of the length of the crown of the incisal edge of the maxillary right central incisor had been broken off. The tooth was firm and discolored. There was a swelling on the palate about the size of a small bird's egg. Roentgenographic study showed a large area extending over to the right lateral incisor and back to the palate (Fig. 7, left).

On August 13, under local anesthesia, the abscess was opened for drainage and a large amount of creamy pus was removed. The root canal was opened and the tooth was treated. Only 2,500 units of penicillin was introduced since no more was available at that time.

All of the odor was gone by August 15 but an exudate was present. The tooth was again treated and 10,000 units of penicillin was sealed into the canal. On August 20 the tooth, now asymptomatic, was again treated and 10,000 units of penicillin was again forced into the tooth and sealed. On August 27, the tooth was still asymptomatic and the canal was filled (Fig. 7, center).

Roentgenographic checkups were made on September 25 and October 26. The tooth was still asymptomatic and the roentgenogram (Fig. 7, right) indicated marked bone regeneration.

Granuloma

Eleven cases were treated.

Case 8. The patient was a white man, aged 18. When the patient was 14, a hoop had bounced up and hit his tooth. There had been no associated pain.

Fig. 6.—Left: Case before treatment, July 9, 1945. Center: Case after completion of treatment, July 11, 1945. Right: Case at final checkup, October 5, 1945. The tooth is still asymptomatic

Fig. 7.—Left: Case before treatment, August 13, 1945. Center: Case after completion of treatment, August 27, 1945. Right: Case at final checkup, October 26, 1945. The tooth is still asymptomatic

In a routine examination it was discovered that the tooth was discolored. There was a large cavity in the mesial surface. A roentgenogram (Fig. 8, left) showed the presence of a granuloma.

On August 29, the tooth was opened and found to be necrotic. It was treated and 10,000 units of penicillin was forced into the tooth and sealed. On September 1, the tooth was asymptomatic. After a second treatment, 10,000 units of penicillin was sealed into the tooth. When the patient returned on September 5, cultures were negative and the root canal was filled (Fig. 8, center).

A roentgenographic checkup on October 5 showed that the area had almost completely filled in (Fig. 8, right) and that the tooth was asymptomatic.

Case 9. The patient was a white man, aged 27. The maxillary left cuspid had a large cavity leading to the pulp chamber. The patient remembered having pain when hot and cold liquids had touched the tooth but he had not been bothered for approximately one year.

A roentgenogram (Fig. 9, left) showed a granuloma at the apex of the tooth. The tooth was opened and found to be necrotic. It was treated and 10,000 units of penicillin was sealed into it.

On September 26, the tooth was asymptomatic and cultures were negative. The tooth was again treated and 10,000 units of penicillin was again sealed into it as a precautionary measure. The canal was filled on September 29 (Fig. 9, center).

On October 26, the tooth was still asymptomatic and a roentgenogram (Fig. 9, right) showed some bone regeneration.

Pericemental Abscess

Three cases were treated.

Case 10. The patient was a white man, aged 18. An actively discharging sinus between the maxillary left central and lateral incisors was discovered during a routine examination. The tooth was tender when pressed distally. The patient had first noticed the discharge a year earlier. Roentgenograms showed an abscess, arising from the middle third of the distal surface of the root. Tests proved that the pulp was vital.

On August 24, 10,000 units of penicillin was injected through the sinus into the area. On August 27, the fistula had closed; the color of the gingiva was normal, and there was no longer any pain on distal pressure. Ten thousand units of penicillin was again injected into the area as a precautionary measure.

Roentgenographic checkups on September 25 and October 30 revealed regeneration of bone.

Discussion

In this preliminary series, a total of 100 patients and 112 teeth were treated. Twenty-eight teeth were treated for putrescent pulps; 15 teeth for acute abscesses; 55 teeth for chronic abscesses; 11 teeth for granulomas; and 3 patients were treated for pericemental abscesses.

In the total series, only one tooth was lost. An acute abscess of the mandibular right central incisor had progressed so far, when the case was discovered, that there was a Class 2 movement of the tooth. Within four days, treatment was given up as hopeless.

Fig. 8.—Left: Case before treatment, August 29, 1945. Center: Case after completion of treatment, September 5, 1945. Right: Case at final checkup, October 5, 1945. The tooth is still asymptomatic

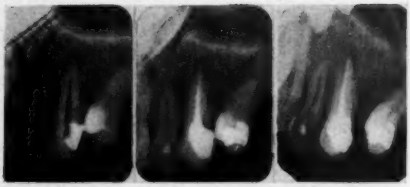

Fig. 9.—Left: Case before treatment, September 25, 1945. Center: Case after completion of treatment, September 29, 1945. Right: Case at final checkup, October 26, 1945. The tooth is still asymptomatic

Only two cases failed to respond to penicillin treatment: one in which laboratory reports showed the canal bacillae to be of the gram-negative paracolon group; and another, a granuloma, which continued to grow. In both of these cases, root amputation was successfully performed.

Some of the cases in the study received penicillin in the gingiva as well as in the canal. The idea of using penicillin infiltrated above the apex of the tooth was presented by Weiner.[2] This procedure was quite painful so that procaine was added to the penicillin solution. Lundy and Osterberg[3] report that local anesthetics do not interfere with the action of penicillin, but enhance it by keeping a high local concentration. I found that this procedure of infiltrating penicillin above the apex of the tooth was not necessary in achieving the desired results, since, if the canal is thoroughly opened and cleaned, sufficient penicillin solution can be forced through the tooth into the apical tissues to be active there. This procedure is simple and much less objectionable to the patient.

I found that higher concentrations of penicillin were more effective than lower concentrations. Five or ten thousand units was used at each treatment and the stock solutions were either 20,000, 40,000 or 80,000 units per cubic centimeter. With this treatment, negative cultures were usually obtained after the second or third treatment.

I have not seen a single case of tooth staining following the use of penicillin in this series. Since penicillin is so very soluble, it can easily be washed out of the tooth if the canal is thoroughly syringed several times with warm sterile saline solution before the canal is dried and filled.

Advantages of Penicillin

I have repeatedly noticed that cases showing an area of rarefaction at the apex of the tooth make a more rapid replacement of lost bone structure when treated with penicillin than would be expected if other germicides had been used. This may be explained by and attributed to the low cytotoxicity of penicillin as has been shown by Fleming,[4] Chain *et al.*[5] and Herrell and Heilman.[6] Because of penicillin's low cytotoxicity, a negligible amount of periapical tissue, if any at all, would be destroyed by it. Thus, since penicillin does not destroy the blood elements, repair may begin immediately, even in its presence. This may account for the more rapid filling in of rarefied areas above the apices of teeth treated, as is shown by the roentgenographic studies. Also, because of its low cytotoxicity, I used concentrations higher than those used by Grossman,[1] Abraham,[7] Adams[8] and McIntyre[9] in the hope of finding an optimum level for use in root therapy.

2. Weiner, L.: The Use of Penicillin in Clinical Dentistry. J.A.D.A. 32:538, May 1, 1945.

3. Lundy, J. S., and Osterberg, A. E.: Use of an Antibacterial Agent Mixed with a Local Anesthetic. Proceedings of the Staff Meeting of the Mayo Clinic. 20:40, February 7, 1945.

4. Fleming, A.: On the Antibacterial Action of Cultures of a Penicillium with Special Reference to Their Use in the Isolation of Bacteria Influenzae. Brit.J. Exper.Path. 10:226, June 1929.

5. Chain, E.; Florey, H. W., et al.: Penicillin as a Chemotherapeutic Agent. Lancet 2:226, August 24, 1940.

6. Herrell, W. E., and Heilman, Dorothy H.: Tissue Culture Studies on Cytotoxicity of Bacterial Agents, Cytotoxic and Antibacterial Activity of Gramicidin and Penicillin; Comparison with Other Germicides. Am.J. Med.Sci. 206:221, August 1943.

7. Abraham, E. P., et al.: Further Observations on Penicillin. Lancet 2:177, August 16, 1941.

8. Adams, F. R.: Penicillin in Pulp Canal Therapy. D. Items Interest 66:1147, December 1944.

9. McIntyre, A. D.: Cases of Acute Oral Lesions Treated with Penicillin. Brit.D.J. 78:262, May 4, 1945.

Conclusions

1. These studies indicate that penicillin is a very effective and useful antibiotic in root therapy.

2. It was found that higher concentrations of penicillin were more effective and gave more rapid results. The optimum number of units, as indicated in this series, would be approximately 10,000 Oxford units for each tooth treatment.

3. Negative cultures were usually obtained after two or three tooth treatments.

4. The low cytotoxicity of penicillin allows for more rapid bone regeneration. —*243 Denslow Avenue, Westwood.*

PRODUCTS OF HUMAN BLOOD FRACTIONATION AND THEIR USES IN DENTISTRY

David F. Mitchell,* D.D.S., Rochester, N. Y.

THE following material concerning the products of human blood fractionation is presented in the form of a preliminary report of investigational activities being carried on at this time. It is hoped that it will be of sufficient interest to stimulate further dental research in this field.

With the development of the extreme need for blood plasma during the wartime emergency, much work was conducted in an effort to refine the technics of blood fractionation. The by-products† resulting from the separation of the plasma have been purified, and successful attempts to utilize them have been made in various fields of medicine.

The need for good hemostatic material in dentistry is obvious. Hemorrhage after extraction or regional injuries is often serious and always annoying. A method is constantly being sought which will control bleeding and aid in the early formation of a healthy blood clot which uneventfully will become organized through the normal healing process.

In 1944, Ingraham and Bailey[1,2] called attention to the use of fibrin foam and thrombin in neurosurgery. This work was of particular interest in that these substances, being products of human blood, could be used as effective hemostatic agents and at the same time as aids in obliterating traumatic or surgical cavities, since they could be left in place to become organized tissue without any untoward effects. These products subsequently were placed on the army supply table.

*School of Medicine and Dentistry, University of Rochester, Rochester, New York; formerly Captain (DC) AAF School of Aviation Medicine, Randolph Field, Texas.

†The products of plasma fractionation employed in this work were developed from blood collected by the American Red Cross, by the Department of Physical Chemistry, Harvard Medical School, Boston, under a contract, recommended by the Committee on Medical Research, between the Office of Scientific Research and Development and Harvard University.

1. Ingraham, F. D., and Bailey, O. T.: The Use of Products Prepared from Human Fibrinogen and Human Thrombin in Neurosurgery. J. Neurosurg. 1:23, January 1944.

2. Bailey, O. T., and Ingraham, F. D.: The Use of Fibrin Foam as a Hemostatic Agent in Neurosurgery: Clinical and Pathological Studies. J. Clin. Investigation 23:591, July 1944.

The foam,[3] packaged in the dry state, is a fluffy mass of fibrin fibers interspersed with visible air spaces, making the mass light, porous and brittle.

Human thrombin,[3] also packaged in the dry state, is an extremely soluble product which, when dissolved in normal saline solution, yields a clear concentrated hemostatic solution.

The foam is soaked in the thrombin solution for a minute or so, during which time it shrinks moderately and becomes pliable.[1] It is then placed in an open wound and closure is effected. Almost immediate hemostasis is evidenced as a result of the presence of the thrombin, held in place by the fibrin matrix. The blood present in the wound infiltrates the foam, and, though artificial in a sense, a relatively normal blood clot is formed in a matter of minutes.

The dry foam and thrombin are fairly stable if kept at room temperature or below. The thrombin in solution loses its potency rather rapidly. However, the original solution advised, though not harmful, is many times stronger than actually needed, so that even if a large percentage of the strength is lost over a period of six to ten days, efficient hemostasis can still be obtained if the thrombin solution has been kept on ice.

The early experimental work was concerned with neurosurgical operations on monkeys.[1,2] Thrombin-soaked foam was placed in a wound of the cerebral cortex, and closure was done. Microscopic examinations of tissue subsequently revealed that the foam was "part of the clot" within twenty-four hours, but was still distinguishable from normal. Cellular reaction to the "foreign" body was indistinguishable from that seen in the organization of a normal blood clot. In one week the foam had largely disappeared, and within three weeks it was no longer discernible. The preparation has since been used in more than 100 neurosurgical operations on human beings.[4] Probably its most spectacular application has been in cases wherein resection of intracranial tumor was accomplished in one operation. The amount of hemorrhage that occurs when foam is not used usually necessitates a multiple stage operative technic.

During the last year or so, Losch,[5] of Children's Hospital, Boston, has removed many teeth from several hemophiliacs and has controlled the resultant hemorrhage immediately and effectively by the use of these products. In the case of a child, three teeth were removed at one time with negligible hemorrhage. Losch reported that with careful observation and the addition of foam to the wound, if needed, uneventful recovery was assured.

Thoma[6] has used the foam and thrombin after the removal of cysts of the maxilla and mandible. More recently he reported the successful use of these products in seven cases of extractions involving lower third molars.[7] He recommended this form of treatment for those cases in which obliteration of space was both desirable and practical. He suggested that the method was particularly applicable in the surgical correction of completely unerupted lower third molars or upper cuspids.

In the Army Air Force a means by which undesirable postoperative sequelae can be prevented is especially needed in order to prevent loss of time by fly-

3. Bering, E. A., Jr.: The Development of Fibrin Foam as a Hemostatic Agent and for Use in Conjunction with Human Thrombin. J. Clin. Investigation 23:586, July 1944.

4. Edsall, J. T.: Personal communication to the author.

5. Losch, P. K.: The Use of Fibrin Foam with Thrombin in Dental Operations. J. Oral Surg. 3:177, July 1945.

6. Thoma, K. H.: Personal communication to the author.

7. Thoma, K. H.: A New Method of Space Obliteration After Odontectomy: A Preliminary Report. J. Orthodont. & Oral Surg. 31:198, April 1945.

ing personnel. Most of these men fall in the age group most frequently troubled by wisdom teeth. Frequently extractions must be performed because of pericoronal infection or its liability. These operations and postoperative care require considerable time, and the patient is frequently grounded during the treatment period, which may be a matter of days.

Fibrin foam and thrombin were tried in the dental clinic at Randolph Field,* primarily for the purpose of controlling hemorrhage. In addition, however, it was hoped that through mechanical blockage, bacterial invasion of wounds and resulting formation of dry socket could be minimized. To consider the use of this material from a theoretical standpoint, the following results might be expected:

1. Immediate hemostasis.

2. Decreased swelling as a result of possible prevention of submucosal extravasation of blood and serum.

3. Reduction of pain as a result of immediate and total closure of the wound, with resultant protection of the nerve endings in the socket.

4. Early formation of a firm clot to act as a mechanical barrier against the ingress and multiplication of oral bacteria, especially if bacteriostatic and bactericidal agents were employed.

5. Early healing and regeneration of bone.

In investigating the possibilities of these products, it was deemed wise to test them in that particular locale of the mouth which is most frequently affected by postoperative complications after extraction, namely, the lower third molar area. In 1937, Krogh[8] reported that in a series of 112 cases in which the operation involved removal of a totally impacted lower third molar, the incidence of dry socket was 28.7 per cent. In 113 cases of partially impacted lower third molar the incidence proved to be 26.5 per cent.

The series which I wish to discuss consisted of thirty cases in which partially or completely unerupted lower third molars of all degrees of impaction were removed. Thrombin-soaked foam was used with no other form of dressing or packing except the local application of various bacteriostatic drugs in powder or liquid form.

Local anesthesia, preceded by the oral administration of atropine, was used. The field was painted with Metaphen and isolated with gauze sponges. A sterile suction tip was employed only in the socket, and care was used to prevent contamination of the wound until it was completely closed and no hemorrhage was apparent.

The majority of the cases were chosen not necessarily on the basis of good prognosis but represented a cross section of the patients reporting for oral surgical operations at this station. For the most part, the patients fell in the age group between 20 and 25 years. Standard methods of placing the foam and applying drugs were not the rule, but instead, an attempt was made, through the use of a variety of drugs and technics, to arrive at a decision as to the best methods to use in proceeding with a subsequent longer series of such cases.

After some of the early operations the sodium salt of penicillin in crystalline form was applied to the wounds. This practice was discontinued, since it has been reported that this form of the drug is irritating when applied topically.[9] It should be used in solution or else replaced by the crystalline calcium salt. However, from the results obtained here, the value of one instillation of penicillin

*Major R. E. Lee, Jr., dental surgeon at this station, performed most of the extractions.

8. Krogh, H. W.: Incidence of Dry Socket. J. A. D. A. 24:1829, November 1937.

9. Florey, M. E., and Florey, H. W.: General and Local Administration of Penicillin. Lancet 1:387, March 27, 1943.

in these sockets is debatable. Tyrothricin is bactericidal and, as suggested by Thoma,[7] may be effective in preventing postoperative infections. The value of the various sulfonamides in sockets after extraction is still highly debatable, though there is no obvious contraindication to their use with fibrin foam and thrombin.

There is some question as to the proper method of applying the foam. Losch[5] suggested packing it tightly into the socket, not only to control hemorrhage but also to insure retention. After a cotton roll is placed over the surface of the foam, the blood is brought up into the mass by means of a suction tip. Thorough infiltration of the foam by blood before total closure of the wound is considered important. In this series, whether the foam was packed or placed loosely in the socket apparently made no significant difference in the results.

In several cases, though the results were deemed successful because subjective symptoms were minimal, it was noted that after four to six days the incisions opened, revealing a socket which healed uneventfully by second intention.

Miscellaneous uses of the material included the removal of completely submerged upper third molars in five cases. The incisions remained closed, with little bleeding, and uneventful healing took place. In five cases the foam was successfully used to control either continuous or secondary hemorrhage from wounds twenty-four hours or more after extraction. In these cases, the foam was lost from the wound within a day or two, but the sockets healed uneventfully by granulation, with no recurrence of bleeding. It was felt that if adequate measures to retain the material in the wound had been employed, the clot would have been normally organized. This assumption was later borne out in four cases in which the patients were known to be "bleeders" (not true hemophiliacs). The foam was placed in simple extraction wounds and mattress sutures were applied over the sockets. Uneventful healing by primary intention occurred after a minimum of hemorrhage. The sutures were left in place for five to seven days.

In many of the cases of extraction of lower third molars, if this had not been an experimental series, the sockets would have been dressed immediately with gauze and an anodyne-antiseptic preparation which, undoubtedly, would have added to the patient's comfort. In two difficult cases (not included in the series of thirty), which involved considerable trauma, such a dressing was used in addition to the foam and thrombin. As a result, hemorrhage was moderated, and discomfort was at a minimum.

This material, packaged in the dry state, is designated as Fraction 1 (Fibrinogen) and Thrombin. The thrombin and fibrinogen are put into two separate sterile saline solutions and, when mixed in the proper proportions, a clot is formed in a matter of seconds which is comparable in its chemical and physical characteristics to a human clot. However, it is a pale gray to blue color and its tensile strength is from ten to twenty times greater than that of a blood clot. To illustrate the properties of the clot, a brief description of the work of Dees[10] may be in order. In an effort to remove renal calculi with a minimum of trauma, a small incision was made in the pelvis of the kidney, the solutions were injected in proper proportions, allowed to clot, and on removal through the relatively small opening, the calculi were withdrawn incorporated in the clot.

The utilization of the clot in dentistry, as far as is known, is still in the conjectural stage. Actual clinical trial has

10. Dees, J. E.: Fibrinogen Coagulum as an Aid in the Operative Removal of Renal Calculi. J. Clin. Investigation 23:576, July 1944.

been limited to only a few cases. Applied to the problem of the lower third molar, it may be of value. It is not inconceivable that after a submerged tooth is removed and the socket is cleansed, the fibrin clot could be used to advantage. Fibrinogen solution could be injected into the socket, allowed to mix with the patient's blood, and the wound closed rather tightly. Then with another syringe, a proportionate amount of thrombin solution could be introduced through the incision with resulting clot formation in a few seconds. This technic may have the advantage over the use of foam and thrombin in that an immediate seal could be effected at the incision line, and ingress of oral fluids could be better prohibited. Possibly the addition of foam to the socket before the fibrinogen is added might be a desirable modification in technic.

So far as is known, bacteriostatic drugs can be utilized without resulting deterioration of either the drug or the clot.[10]

Summary and Conclusions

Fibrin foam and thrombin were placed in the sockets after removal of impacted or unerupted lower third molars in thirty cases, and also in sixteen other cases of extraction. From this short series, in spite of inadequate control measures, the following tentative conclusions may be drawn:

The use of foam and thrombin is not in any way injurious to the patient.

The hemostatic effect is remarkable and is particularly useful in those persons who are likely to have excessive hemorrhage. Actually, absolute hemostasis was not obtained in many cases. A slight amount of blood was noticed in the saliva, beginning about one hour after the operation and continuing for approximately four to six hours. This small amount of bleeding usually was not noticed by the patient unless he was told to look for it. It certainly was not troublesome.

This method is applicable to extractions of those teeth which are completely unerupted, in which case total flap closure over the wound is possible. Under these conditions a barrier to the ingress of oral bacteria is offered, and a firm clot is easily retained in the wound. However, when hemostasis is of primary importance, the materials may be safely applied in open sockets if their retention is assured.

True evaluation of swelling and postoperative pain in this series was impossible, but these factors did not appear to be reduced. Thus, the value of this procedure after operations that cause considerable trauma may be limited.

Complete prevention of undesirable postoperative sequelae as a result of local infection was not obtained. Complications developed in five of the thirty cases. The use of this technic apparently did not appreciably affect the incidence of postoperative infection.

Early healing and regeneration of bone cannot be justifiably assumed from this series.

There was apparently no contraindication to the use of the sulfonamides and penicillin in conjunction with the foam and thrombin, but the value of such drugs in this series was questionable.

The value in oral surgery of the fibrin clot, made by the mixture of liquid fibrinogen and thrombin, is still uncertain because of limited clinical trial. Further experience may reveal some advantage over the use of foam and thrombin as a result of an immediate seal at the incision line and elimination of the entrance of oral fluids.—*260 Crittenden Boulevard.*

IDIOSYNCRASY TO SULFANILAMIDE: REPORT OF A CASE

Ben Pine,* A.B., D.D.S., and Nicholas P. Popov,* M.D., Stuttgart, Ark.

THIS case is reported because of the patient's unusual idiosyncrasy to sulfanilamide. Having been sensitized in the left ear, the patient reacted with sensitivity in the same ear after the drug was administered at a later date in a tooth socket.

History and Examination.—A 35-year-old private, civilian and military occupation photographer, was admitted to the hospital on March 14, 1945, with the chief complaint of pain and suppuration from his left ear. He gave a history of chronic recurrent bilateral otitis, aggravated by hot weather and water. The left ear began to suppurate on the day of admission. The tympanic membrane was perforated and red, with absence of normal landmarks. Culture showed staphylococci and gram-negative bacilli.

Treatment.—The patient was given oral sulfadiazine (15 grains) every four hours, day and night, and sulfanilamide powder was used locally in the left external auditory canal. Recovery was uneventful and sulfadiazine administration was reduced to 15 grains four times a day on March 19, 1945, and was discontinued ten days later.

Course.—The tympanic membrane was healed and landmarks and appearance were normal on March 24. There was a slight redness of the left external auditory canal.

The patient was to be discharged for full duty, but, on March 25, sulfanilamide powder was placed in the left external auditory canal. On the following day there was profuse dermatitis with thin, watery suppuration. On March 28, to establish positively that the inflammation in the external auditory canal was caused by sulfanilamide, a small amount of sulfanilamide powder was placed on an applicator and rubbed over the patient's left auricle. This resulted in a severe suppurative inflammatory reaction, which gradually subsided, and the patient was discharged for duty on April 8. He was informed that he was sensitive to sulfanilamide, and that he must warn all physicians and dentists of this sensitivity in the future when medication was administered. After discharge the patient's course was followed in the eye, ear, nose and throat clinic. The suppuration ceased on April 17, and on April 23 the ear appeared well. On April 25, the patient reported to the hospital dental clinic with pain in his lower left second bicuspid tooth. X-ray examination revealed a thickening of the dental periosteum. Clinically the tooth was extremely tender to percussion and markedly mobile. It was decided that a poorly fitting clasp on the lower partial denture was the causative agent. The tooth was extracted under local procaine anesthesia, and sulfanilamide powder (approximately 3 grains) was inserted in the socket, at that time a routine procedure. The patient had failed to mention his previous reaction to the use of sulfanilamide. On

From AAF Station Hospital, Stuttgart, Ark.

*Captain, AUS.

Fig. 1.—Photograph of left external auditory canal of patient after administration of sulfanilamide following extraction of tooth

April 26 the patient reported to the dental clinic, complaining of itching of his hands and left ear, beginning about six hours after extraction of his tooth. The tooth socket was normal and lacking in subjective symptoms. The itching grew progressively intense, the hands were edematous and erythema had developed on the hands and elbows. The left ear presented edema of the external auditory canal (Fig. 1) and began to vesiculate and suppurate. The patient was readmitted to the hospital.

His hands and elbows remained about the same, but his ear became progressively worse until April 27, when all symptoms began to subside. By May 1, edema of the hands had disappeared and the skin on the hands and on the left ear began to peel. The ear was dry at this time and itching was very slight. On May 10, the left ear again began to suppurate. It still presented some inflammation of the external auditory canal. On May 21, the ear was dry and the patient was free of subjective symptoms. The only residual condition was a slight erythema of the left external auditory canal. The patient was discharged for duty, with a pointed warning to give the foregoing history before accepting medication in the future.

The case was followed and the patient had no further complaints. His ear was clear of all symptoms by June 4, when he was last seen in the eye, ear, nose and throat clinic.

Summary.—A patient with previously demonstrated acquired sensitivity to sulfanilamide was admitted to the hospital dental clinic for extraction of a lower left second bicuspid. The then routine procedure of inserting sulfanilamide powder in the socket after extraction was followed. Reaction occurred in six hours. The principal site of reaction was the left ear, where sensitivity had originally been established.

1. A history of the patient's reaction to the sulfonamides should routinely be taken prior to use of these drugs.

2. Whenever sensitivity of this type is encountered, the physician or dentist must impress upon the patient the importance of mentioning this sensitivity prior to future medication.

3. Intermittent administration of the sulfonamides should be avoided.

4. Routine use of the sulfonamides in minor conditions (such as following tooth extraction) is not justified. Abramowitz[1] lists as possible complications to sulfonamide therapy: allergic sensitization; photosensitization; interference with action of roentgen rays; delay in wound healing time; local sanguineous oozing; interference with the action of the sulfonamides by local anesthetics of the procaine series and by the vitamin para-aminobenzoic acid; resistance to sulfonamide therapy; inability to make subsequent use of the drug when most needed.

5. The field of desensitization warrants further study.—*Station Hospital, Camp Beale, California.*

1. Abramowitz, E. W.: Hazards of the External Use of Sulfonamide Compounds. Arch. Dermat. and Syph. 50:289, November 1944.

USE OF FEMALE SEX HORMONE IN THE TREATMENT OF CHRONIC DESQUAMATIVE GINGIVITIS

Floris van Minden, D.D.S., Chicago

Among the oral manifestations which have long baffled dentists, chronic desquamative gingivitis is one of the most interesting and persistent. The condition is variously described by Thoma,[1] Prinz and Greenbaum[2] and Cahn.[3] Their consensus is that the syndrome is comprised of diffuse inflammation of marginal gum tissue, followed by desquamation of papillary and gingival epithelium, thereby disclosing the characteristically deep bluish-red connective tissue which bleeds readily upon slight irritation. Thoma and Prinz believe the condition to be of endocrine or hormonal origin, since it occurs most frequently in women with irregular menstruation or in those at the climacteric.

The three types of this disease described by Ziskin and Zegarelli[4] are: atrophic (loss of epithelium by pressure of inflammatory exudates and edema in the corium); true desquamative (stripping of epithelium in layers); and vesicular (formation and rupture of vesicles). These blisters may be in or beneath the epithelium and the fluid contains bacteria. The gingival reddening appears primarily at the labio-buccal surfaces of both jaws, and the papillae are highly edematous. In the true desquamative type, the surface epithelium separates from the underlying tissue. In the vesicular type, blisters filled with a clear serum-like liquid form and break, leaving shallow ulcers covered with granulations. These lesions tend to heal, only to recur elsewhere at intervals. The gums are extremely tender to pressure, and there is a burning sensation connected with the ingestion of solid or hot food. Cold food is better tolerated.

Heretofore, authorities on the disease have disagreed upon its origin, contributing causes, treatment and prognosis, but have admitted that no satisfactory treatment existed. Prinz and Greenbaum claim that "presence of teeth is imperative for its manifestation." More recently, Ziskin and various collaborators have introduced a new theory based on the hypothesis that these chronic gum diseases are due to a sex hormone deficiency.[5] This theory was corroborated further by Ziskin's studies of women who were suffering from various gynecologic disturbances owing to a deficiency of

1. Thoma, K. H.: Oral Diagnosis. Philadelphia: W. B. Saunders. Second Edition, 1943, p. 265.

2. Prinz, Hermann, and Greenbaum, S. S.: Diseases of the Mouth and Their Treatment. Philadelphia: Lea and Febiger. Second Edition, 1939, p. 167.

3. Cahn, Lester R.: Pathology of the Oral Cavity. Baltimore: Williams and Wilkins Co., 1941, p. 154.

4. Ziskin, D. E., and Zegarelli, E.: Clinical and Histopathological Study of Chronic Desquamative Gingivitis and Its Treatment with the Sex Hormones. J. D. Res. 21:341, 1942.

5. Ziskin, D. E.; Blackberg, S. N.; and Slanetz, C. A.: Effects of Subcutaneous Injections of Oestrogenic and Gonadotropic Hormones on Gums and Oral Mucous Membranes of Normal and Castrated Rhesus Monkeys. J. D. Res. 15:407, 1936.

estrogen[6] (the female sex hormone) and who responded favorably to its administration.* In this experimental work, Ziskin established the ability of estrogen to stimulate connective tissue. He observed that it caused a firmer, more definite keratin layer in the alveolar gingivae and that it produced hyperkeratinization and hyperplasia of the oral epithelium. He showed, in later studies on men, that testosterone propionate produces a stimulating action on epithelium and connective tissue with a resultant benefit to the gums.[7]

On the basis of these findings, Ziskin and Zegarelli treated a series of ten cases of chronic desquamative gingivitis (eight women and two men) with topically administered gonadal hormones according to the sex of the patient. They reported that after two or three months of concentrated and continuous treatment, followed by a period of intermittent treatment, all cases had benefited and several cases had been definitely controlled. The true desquamative type of case responded best, while the vesicular type was most resistant.

Although cases of chronic desquamative gingivitis are rare, I recently had occasion to observe and treat such a case of the vesicular type. Because it presented several unusual deviations from the typical pattern, a detailed report may be valuable for purposes of comparison with similar cases.

Report of Case

History.—The patient, a slender woman, aged 67, reported with a history unusually free from serious illness, skin disease or allergy. She had received fairly regular dental care since her youth and had been well until the present disease had developed gradually. Her dentist had given her some prophylactic care and a limited restorative service and had made several unsuccessful attempts to treat the diseased gums. He had referred her to the dental school of a university about a year prior to her visit to me.

The periodontia department there had made an intensive study of her case in consultation with an internist and a dermatologist, and had diagnosed the case correctly. Treatment consisting of various topical applications to the gums, thorough prophylaxis, vitamin therapy and special diets over a period of months had brought no improvement. Considering the case hopeless, the periodontist had advised that the remaining teeth be extracted and full dentures made. The patient had been favorably inclined, although this course held no promise of a cure. Her son, however, had suggested that she consult a private dentist for substantiation of this course. The patient came to me in May 1942.

Examination.—(Clinical): The patient was apparently in good health. Several teeth in poor condition remained in each jaw. The missing teeth had not been replaced. Some of those remaining showed evidence of periodontoclasia. Others presented ill-fitting fillings or crowns and recurrent caries. The gingivae around most of the teeth showed irritation and inflammation. In the edentulous spaces in both jaws, especially in the lower, several areas, marked by a deep redness, were extremely painful to the slightest pressure. In addition, there were numerous small vesicles filled with thin clear fluid. These blisters developed rapidly in size, then burst and peeled off (desquamated) leaving the underlying connective tissue raw, red and very painful, whereupon the process would be repeated in many other locations. These areas, both unbroken and vesicular, extended from the edentulous spaces to around and between the remaining teeth, the desquamative lesions further extending over the mucous membrane on the left side of the floor of the mouth for an irregular area of about one-half inch in diameter. The tongue was extremely smooth, almost like satin, with no apparent papillae. The buccal mucosa and palate appeared normal but there was considerable soreness in the throat which presented red areas similar to those of the

6. Ziskin, D. E.: The Effect of Hormonal Treatment in the Gums and Oral Mucosa of Women. J. D. Res. 16:367, 1937.

7. Ziskin, D. E.: Effect of the Male Sex Hormone on the Gingivae and Oral Mucous Membranes of Rhesus Monkeys and Humans. J. D. Res. 20:243, 1941.

*Estrogen is the monobenzoate of estradiol, commercially known as Progynon B.

affected gums, although not so severe. There was no external indication of degenerative or deficiency disease.

(Laboratory): A blood test showed 4,000,000 red cells, 7,100 white cells, 9.8 mg. calcium and 2.6 mg. inorganic phosphorus per 100 cc. of serum, 76 per cent hemoglobin and 1 mg. of vitamin C.

(Microscopic): An oral smear revealed a few spirilla and fusiform bacilli, similar to those found in Vincent's infection. These findings indicated no definite deficiency that would explain the patient's condition or suggest treatment.

Discussion.—The patient was advised that, since extraction of her remaining teeth would probably not cure her condition, it was thought best to retain them, although this would necessitate extensive operative work and two large partial dentures. Because these dentures would have to be placed only in part over the painful gums, it was thought that this course would result in less discomfort than would be the case with full dentures.

The patient, however, refused the advice and decided to have all of her teeth extracted in the hope that in time her gums would heal.

Treatment.—Impressions for full upper and lower immediate dentures were taken during the course of the extractions which were done gradually to preserve the patient's appearance. The patient began wearing the dentures in June 1942 and was very uncomfortable for several months because of the fresh extraction wounds and the large painful areas of desquamative gingivae which could not stand the pressure of mastication.

Course.—The lower denture became loose and was rebased in October. As predicted, no improvement had followed the extractions, and the pressure of the dentures was an added discomfort.

In January 1943, seven months after the extractions, the wounds had healed completely, but the lower anterior alveolar ridge and both upper posterior ridges still showed large desquamative areas which were extremely painful to touch or pressure.

Further Treatment.—In the meantime I had studied Ziskin's work with estrogen in chronic gum diseases, and I persuaded the patient to try this treatment experimentally. The first application of an ointment, with a lanolin base containing 5,000 international units of estrogen per gram, was made on February 1, 1943. About one and one-half grams of this ointment was applied to the gingival surfaces of both upper and lower dentures directly over the afflicted areas with instructions not to rinse the mouth or remove the dentures for several hours, thereby facilitating absorption of the ointment. This treatment was applied three times a week, beginning in February, and was reduced gradually to once a week in April.

Toward the end of March it became necessary to change to the commercially available Progynon D H, which has a Tegan base containing 1,800 rat units of estrogen per gram. One rat unit is probably the equivalent of about five international units.* This would establish a concentration of approximately 9,000 international units per gram, almost twice the strength of the material I had been using. This was greatly compensated by the fact that the Tegan base proved to be greasier and less easily absorbed than the lanolin base of the former product, so that no material change in effect on the patient was expected. Due allowances should also be made for the probable loss of the major part of both materials through salivary action or swallowing.

For the remainder of March and during April, Progynon D H was applied in the same manner and quantity as employed with the previous material.

Course.—Because of continued complaints of sore throat and difficulty in speaking, I had referred the patient to a laryngologist in February. He had discovered a serious avitaminosis. Despite the patient's previously unsuccessful experience with vitamin therapy, I prescribed 150,000 international units of vitamin A and six tablets of vitamin B complex twice daily. This was later augmented with 60 mg. of calcium pantothenate daily. These quantities were slowly reduced to 25,000 international units of vitamin A

*This refers to comparative biologic activities in rats, where it has been shown that estrone, one of the estrogenic hormones, has about one-fifth the activity of estradiol benzoate. In human beings, these two compounds are nearly equal in activity. This makes it difficult to establish the exact value of a rat unit, while the international unit is standardized.

and two tablets of vitamin B complex twice a day and 100 mg. of vitamin C in May.

After three months, the desquamative areas were a little less painful; there was less vesicular formation and a marked improvement of the throat.

In the meantime, the patient, who was then 68 years old and fully 15 years past the menopause, experienced menstrual flow for a period of four days. Examination by her family physician was negative. The amount of estrogen application was reduced to a dose just below that causing menstrual flow and only one treatment was given each week. One month later the patient again reported several days of vaginal staining. To rule out possible pelvic malignancy, I referred her to a gynecologist who ordered the estrogen discontinued for a month, after which he examined the patient. He found no pathologic condition of the pelvis and approved resumption of estrogen therapy.

While estrogen treatment was suspended, the vaginal bleeding ceased and the throat became worse. Upon its resumption, the reverse took place. This establishes a direct relation between topical estrogen application in the mouth and vaginal flow, and is, I believe, the first time such a relation has been reported in the dental literature.

A "tolerance dose," sufficient to avoid vaginal staining, was decided upon and the patient applied the ointment at home each day. Vitamin dosage was increased to 200,000 units of vitamin A, six tablets of B complex and 300 mg. of vitamin C a day. By July 1943, no vesicles were being formed, although there were still large deep red areas, sensitive to pressure, but not so prone to bleed as before.

In this condition the patient left for an extended vacation with instructions to continue treatment. She did not do so, and returned in the fall, her resistance so lowered that for the remainder of the year she was subject to a series of upper respiratory tract infections, with a concomitant setback in the gingival condition. The vesicles had not recurred but there was far more pain upon pressure.

After her illness, I finally secured the patient's cooperation, and despite the necessarily small doses of estrogen, we made rapid progress. In April 1944, 90 per cent of the original symptoms had disappeared, although red, tender areas remained, especially in the lower anterior region. Estrogen and vitamin treatment, with minor modifications, was advised for a prolonged period to build up resistance to a possible recurrence. In February 1945, the floor of the mouth was completely healed, the throat was improved, and the case was considered cured. When the patient was last seen, in November 1945, it was difficult to determine where the original lesions had been.

Summary

1. This case of chronic desquamative gingivitis was highly resistant to treatment. It required more than a year (with interruptions) to effect substantial improvement, and nearly two years to establish a cure.

2. Results obtained by prolonged topical use of estrogen indicate its value as a therapeutic agent in this disease, and also that the disease may be due to deficiency of the female sex hormone.

3. The unusual recurrence of menstrual symptoms, and their cessation upon interruption of treatment, establishes a definite relation between topical use of estrogen in the mouth and gynecologic conditions.

4. Greater resistance to respiratory infection and improvement in gingival condition following intensive vitamin therapy indicate possible complication of this case by avitaminosis of long duration.

5. Results can be obtained only by prolonged treatment, ample dosage and full cooperation of the patient.—*25 East Washington Street.*

THE Journal OF THE
AMERICAN DENTAL ASSOCIATION

OCTOBER 1946 • VOLUME 33 • NUMBER 19

HAROLD HILLENBRAND, D.D.S., *Editor*

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EDITORIALS

GRADUATE, POSTGRADUATE AND REFRESHER COURSES OFFERED FOR 1946-1947 TERM

A SECOND[1] list of graduate, postgraduate and refresher courses offered for the 1946-1947 term has been compiled by the Council on Dental Education and appears elsewhere in this issue.[2] More than two-thirds of the dental schools, in addition to the Army and Navy, are offering courses or are planning them for early in 1947. Present reports indicate that all available places in many courses have already been taken, largely by veteran dental officers. In some instances there is a waiting list of considerable proportions because of the unusual postwar demand.

The dental schools of the country have marshalled all of their resources to meet the demand for continuing education, a demand greatly accelerated by the war. The list of courses now offered in many categories indicates that their efforts have not been without results. The fact remains, however, that the dental schools of the country do not yet have sufficient facilities and resources to meet even the normal demand for graduate, postgraduate and refresher courses. This situation is directly attributable to the lack of material support under which dental education has labored through all of its history. Because of it, many dental schools must still devote all of their efforts to improving their undergraduate program and are unable to venture into the fields of graduate and postgraduate education.

In recent years, the W. K. Kellogg Foundation has provided a significant stimulus to graduate and postgraduate education in dentistry by making substantial grants to several schools. Many veteran dentists will derive immediate benefits from this program and, in the longer view, it will aid the development of permanent courses of graduate and postgraduate education in dental institutions. It is obvious, however, that broad expansion in the higher fields of education in dentistry must await an improvement in the undergraduate program that can come only through additional

1. J.A.D.A. 32:1155, September 1, 1945.
2. See page 1316.

financial support. When such support is adequately provided, the opportunity for graduate and postgraduate education will be materially enlarged. Until such a time comes, many dentists will not have the advantage of needed refresher courses, less men will be prepared for the specialties through advanced study, and essential teaching and research posts cannot be filled by dentists with graduate degrees. This cycle is harmful to both dental education and practice. It can be intercepted most effectively and quickly by the provision of more adequate support of the dental schools of this country through an increase in the private and public funds on which they depend.

WALTER H. SCHERER COMPLETES SECOND TERM AS PRESIDENT OF AMERICAN DENTAL ASSOCIATION

For the first time in the modern history of the American Dental Association, a president has served for two terms. In the annals of the present American Dental Association (1922) and in those of its predecessor, the National Dental Association (1897-1921), no similar record is found. In the earlier American Dental Association (1859-1897) only four men had served two or more terms: W. W. Allport, W. H. Atkinson, J. D. Patterson and J. Y. Crawford.

Walter H. Scherer became president of the American Dental Association in 1944. Restrictions brought about by the war prevented the holding of the annual elections by the House of Delegates, and Dr. Scherer was continued in office through the 1945-1946 term. Only the extraordinary occasion of a second world war dictated placing the burdens of this office on a single man for the second time. The high emergencies of the moment demanded unceasing attention so that dentistry could participate fully in the war effort, and Dr. Scherer gave unstintingly of his time and talents to the many problems that were created by the conflict.

In spite of these wartime crises, Dr. Scherer's term in office has been highly productive and successful. The Association made a notable contribution to the war effort by working effectively in the procurement campaigns, the salvage and war loan drives. The problems of the veteran dental officer have been helped to solution. Dr. Scherer at all times manifested a deep interest in the conditions surrounding the work of dental officers in the armed services. He encouraged and supported the legislation necessary to correct inequalities in both the Army and Navy. At a great sacrifice of time and leisure, he aided dental meetings in all parts of the country by his presence and his addresses. He solved, with efficiency and dispatch, many of the vexing problems of administration that were posed by the war emergency.

In serving as President of the American Dental Association during these critical times, Dr. Scherer has won the appreciation of all members and of the profession. His work in office on behalf of dentistry in all of its phases will remain as a part of dentistry's outstanding contribution to the victory and the peace.

HARRY B. PINNEY TO RETIRE AS GENERAL SECRETARY OF THE ASSOCIATION AT MIAMI MEETING

HARRY B. PINNEY, General Secretary of the American Dental Association for nineteen years, will retire at his own request at the next annual meeting of the House of Delegates at Miami. During his term of office, the Association became a national organization in both size and prestige. Since 1927, when Dr. Pinney assumed office, the membership of the Association has doubled, reaching a peak of 61,000 members in 1945. This represents more than 75 per cent of all of the dentists of the country who are eligible for membership and is, perhaps, the highest representation of any association in any profession. In that period, too, the Central Office staff was expanded from ten employees in 1927 to more than eighty today.

Important as such physical growth of an organization is, it must not be permitted to overweigh advances in activity, influence and achievement. The American Dental Association today speaks for dentistry in the United States. It is engaged in many research, educational and legislative activities designed to protect and enhance public and professional welfare. It offers a multitude of services and benefits to members. Most of these activities have come to their full growth in the past two decades, and Dr. Pinney's work has contributed greatly to their development.

Dentists in every part of the country have learned to recognize the devotion to duty, the loyalty to the principles of the dental profession and the friendly good will which characterized Dr. Pinney's term in office. His friends everywhere will regret the close of so productive a career, yet will recognize his right to spend the rest of his years free from the burdens of office. On his retirement, Dr. Pinney will take with him the good wishes of thousands of dentists and the gratitude of an organized profession to which he made so many valuable and permanent contributions.

DENTAL REPRESENTATION IN THE WORLD HEALTH ORGANIZATION

AS A RESULT of a declaration made at the United Nations Conference in San Francisco in 1945, an International Health Conference was held in New York last June. The United States and fifty other nations were represented at this conference which drew up a charter for a World Health Organization. This charter will become effective when ratified by a majority of the participating nations. An Interim Commission was also established to act until the charter is finally adopted.

The basic function of the World Health Organization will be to implement one of the objectives of the United Nations. The new organization, which will be one of the specialized agencies of the United Nations, will either absorb or direct all

existing intergovernmental health agencies including those of the League of Nations and the United Nations Relief and Rehabilitation Administration (UNRRA) health division. For the first time, all participating nations will have a single health agency.

The World Health Organization has been given unprecedented power in the field of international health. It has the authority to make regulations in five fields of international health protection, from drug advertising to quarantine. These regulations will be binding on member nations, unless they advise the agency to the contrary. From all of this it is obvious that the new agency will have a significant impact upon international health and health problems.

It is no longer debatable whether or not dentistry is an integral part of a health service; yet nowhere in its charter or in its accrediting of representatives and consultants has the World Health Organization acknowledged that fact. An inquiry directed to the Interim Health Commission elicited the reply that dental representation was a matter for future consideration.

The charter of the World Health Organization clearly states that "the objective . . . shall be the attainment by all peoples of the highest possible level of health." This objective cannot be fully attained unless there is recognition of the fact that the prevention and control of dental diseases play an important role in the promotion of health. The House of Delegates of the American Dental Association will be well advised to consider this matter and to call the necessary facts to the attention of proper authorities of the World Health Organization by official resolution.

NEW COVER AND STYLE FOR THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION

Readers will have noted before reaching this page a complete revision of the format and style of The Journal. The changes were made in order to use modern typographic design in the interests of a more readable and attractive publication. The new cover has the fresh, functional approach that is characteristic of recent trends. The style for the scientific articles and the various departments has been changed to gain a better method of presentation and to make all material readily accessible to the reader. The type face used for the text has not been changed because Baskerville remains unchallenged for its classic, sharp and legible imprint. In the new style it has been combined with the modern letter used in the headings (Vogue Bold) in order to define the essential elements of the magazine more quickly. Comments from readers will be received with interest.

The changes represent another point of progress in the program that has been projected for The Journal. For more than a decade, planning for The Journal has led toward the publication of a full, regular issue every two weeks. The Mid-monthly issue, in recent years, has met the need of providing members with topical information on current problems in dentistry. If current shortages are not aggravated

in the next few months, it is hoped that the Midmonthly issue can be incorporated into a second regular issue which will appear on the fifteenth of each month. Present plans indicate that this change in frequency of issue may be made at the start of next year.

THIRTY-THREE STATES CONCLUDE AGREEMENTS FOR DENTAL PROGRAMS WITH THE VETERANS ADMINISTRATION

THE postwar reorganization of the Veterans Administration made possible the development of new types of programs for rendering dental and medical services to veterans. The old system, under which a restricted number of dentists in a community were appointed as "designated" dentists, was replaced by a new program which offered a wider choice of practitioner to all veterans. In this program, any dentist who is recommended by the state dental society and who agrees to work for fees stipulated in the state agreement is eligible to treat those entitled to the benefits provided by the Veterans Administration.

No over-all program has been concluded at the national level, since the right to determine the fee schedule is properly reserved to the states in order to meet varying local conditions. To place the plan in operation, therefore, agreements between the individual states and the Veterans Administration had to be effected. These agreements usually included (1) the terms of a state-wide fee schedule and (2) the mechanism to be used for approving dentists who wish to participate in this program.

A preliminary survey by the Committee on Economics, as of September 1, reveals that thirty-three states have concluded agreements and that ten additional states are negotiating agreements. There has been no report on the status of negotiations from six states.

There is already considerable evidence that the dental program of the Veterans Administration will assume sizable proportions. In order to provide needed dental service for veterans and to prevent the accumulation of dental defects, it is desirable that all states conclude agreements as soon as possible. The provision of needed dental care for those who fought in the armed services should not be too long delayed.

EIGHTY-SEVENTH ANNUAL SESSION

HOUSE OF DELEGATES

AMERICAN DENTAL ASSOCIATION

OCTOBER 14-16, 1946

COLUMBUS HOTEL

MIAMI, FLORIDA

PARTIAL PROGRAM

OCTOBER 10: Board of Trustees, first meeting, morning.

OCTOBER 13: State Society Officers' Conference, all day.

OCTOBER 14: House of Delegates, morning and afternoon meeting.

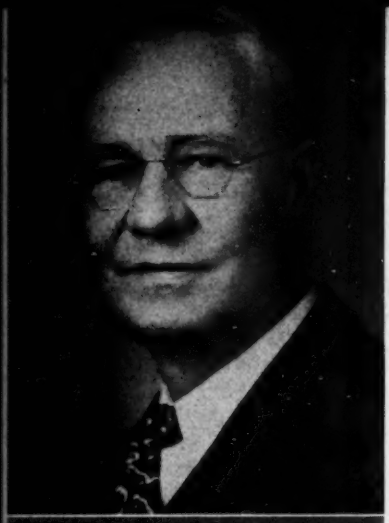
OCTOBER 15: House of Delegates, afternoon meeting.

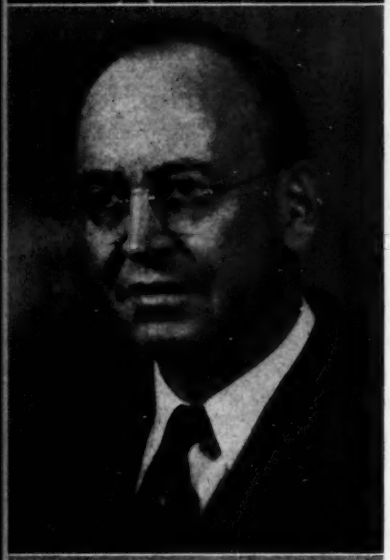
OCTOBER 15: Committee on Legislation, open meeting, morning.

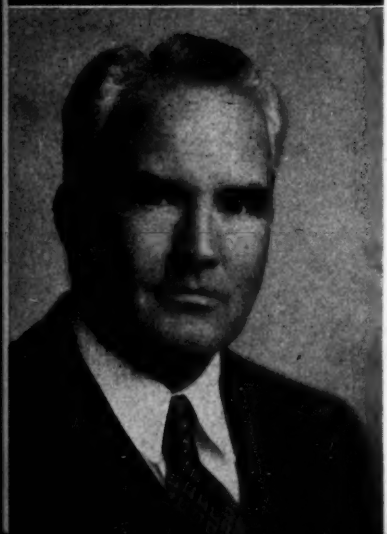
OCTOBER 15: Hospitality Hour with the Miami Dental Society, the East Coast Dental Society and the Florida State Dental Society acting as hosts, evening.

OCTOBER 15: President's Dinner in honor of Walter H. Scherer, evening.

OCTOBER 16: House of Delegates, afternoon meeting.





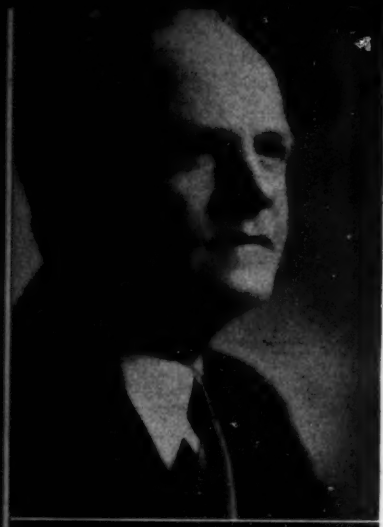


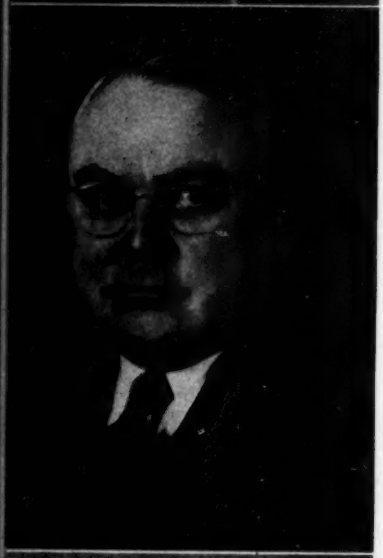
Walter H. Scherer, above, President; Herbert E. King, top left, First Vice-President; William I. McNeil, center, Second Vice-President; Eugene M. Clifford, lower left, Third Vice-President

Sterling V. Mead, below, President-Elect; Harry B. Pinney, top right, General Secretary; Roscoe H. Volland, center, Treasurer; David W. McLean, lower right, Trustee, Thirteenth District

Russell A. Sand, upper left, Trustee, Eleventh District; Fred J. Wolfe, center, Trustee, Twelfth District; Harvey J. Burkhart, lower left, Trustee, Second District

Henry Hicks, upper right, Trustee, First District; Howard E. Summers, center, Trustee, Sixth District; H. B. Washburn, lower right, Trustee, Tenth District





Carlos H. Schott, upper left, Trustee, Seventh District; Clyde E. Minges, center, Trustee, Fifth District; Edward J. Jennings, lower left, Trustee, Fourth District

C. J. Wright, upper right, Trustee, Ninth District; Harold W. Oppice, center, Trustee, Eighth District; LeRoy M. Ennis, lower right, Trustee, Third District

HOUSE OF DELEGATES HOLDS 87th ANNUAL SESSION IN MIAMI, OCTOBER 14-16

THE House of Delegates of the American Dental Association will resume its annual sessions, after a lapse of one year, on October 14-16 at Miami. No scientific session will be held until 1947, owing to continuing restrictions on hotel and convention facilities. The House of Delegates at Miami will determine the time and place of the full session in 1947.

Meetings of House

The first meeting of the House of Delegates will be called to order by President Walter H. Scherer on Monday morning, October 14. As the agenda for the House are extensive, meetings will be held on Monday, Tuesday and Wednesday afternoons. The final meeting of the House of Delegates on Wednesday will witness the first election of officers and trustees in two years. In addition to the usual officers, the House will elect trustees for eight districts. Trustees whose terms have expired are: David W. McLean, Russell A. Sand, Fred J. Wolfe, Harvey J. Burkhart, Henry Hicks, Howard E. Summers, H. B. Washburn and Carlos H. Schott.

Harry B. Pinney has announced his retirement as General Secretary, and his successor will be named at the Miami meeting.

Headquarters Hotels

Headquarters for the session will be maintained at adjoining hotels, the Columbus Hotel and the McAllister Hotel. Convention delegates will also be housed at the Everglades Hotel, which is within walking distance from headquarters. Present indications are that attendance will be heavy, but that hotel accommodations will be available in some of the smaller hotels.

Board of Trustees

The Board of Trustees will have its first meeting on Thursday, October 10, and will continue in session until Sunday. The Board will also meet frequently after meetings of the House of Delegates.

Local Committees

Local arrangements for the meeting are under the general direction of E. B. Penn. Other chairmen and their committees are: *Women's Auxiliary,* Mrs. J. Murray Cox; *Associated Groups,* George M. Shields; *Information,* C. W. Swords; *Banquet,* S. G. Alderman; *Publicity,* H. L. Cartee; *Reception,* J. Murray Cox; *Halls and Hotels,* T. C. Henslee.

Transportation

Air lines operating into Miami are Delta Airlines, Eastern Airlines, National Airlines and Pan American World Airways. Railroads operating directly into Miami are the Florida East Coast Railway and the Seaboard Airline Railway. Various types of transportation by water are also available to Miami. Because of the proximity of Miami to Cuba and other vacation territory, many delegates will combine business and pleasure.

NEWS OF DENTISTRY

A.D.A. HOUSE OF DELEGATES TO OPEN ANNUAL MEETING WITH BUSINESS SESSION OCTOBER 14

The three-day meeting of the House of Delegates of the American Dental Association will get under way Monday, October 14, at 10 a.m. with the first of four business sessions in the Biscayne Room of the Columbus Hotel.

Subsequent business meetings will be held Monday at 1:30 p.m., Tuesday at 1 p.m. and Wednesday at 1 p.m.

The Biscayne Room also will be the scene of an open meeting of the Committee on Legislation, Tuesday at 9 a.m., and of the annual President's Dinner Tuesday evening at 8. The dinner will be preceded by a "Hospitality Hour" at 7 on the mezzanine floor, at which the Miami Dental Society, the East Coast Dental Society and the Florida State Dental Society will be hosts.

Among preconvention meetings will be those of the Council on Dental Health, Friday, Saturday and Sunday, October 11, 12 and 13, and the Council on Dental Education, Friday and Saturday, October 11 and 12.

The State Society Officers' Conference, meanwhile, has set Sunday, October 13, as the date for its annual meeting, with J. E. John, Roanoke, Va., president, presiding. Principal speaker will be Walter H. Scherer, President of the American Dental Association, with the following scheduled to lead discussions: M. M. Fowler, "Program of the Veterans Administration"; L. M. Cruttenden, "State Secretary"; Harold Hillenbrand, "Publications"; Rear Admiral William T. Wright, Jr., "Public Health Service"; and C. H. Jamieson, "Programs for State Societies."

After the House of Delegates convention, the Board of Trustees will open meetings Thursday.

Specialty groups meeting at Miami Beach during the week will be the American Dental Assistants Association and the American Dental Hygienists' Association, both October 14-16, and the American Society of Oral Surgeons, October 9-12. The American Association of Dental Examiners will meet October 12 and 13 at Miami.

A.D.A. LEGISLATIVE COMMITTEE TO HOLD MEETING OCTOBER 15

The Committee on Legislation of the American Dental Association will hold an open meeting October 15 at 9 a.m. in the Biscayne Room of the Columbus Hotel, Miami, Carl O. Flagstad, chairman, has announced.

The program will include a three-part discussion of federal legislation embracing: (1) the Army, the Navy, the Veterans Administration and the Public Health Service; (2) American Dental Association legislation for a dental health program; and (3) social health legislation, including the Wagner and a number of similar bills.

Also scheduled for discussion is state legislation involving (1) licensure of dental technicians, (2) licensure of specialists and (3) reciprocity in state licensure.

The status of the Dental Corps in the various federal agencies will be presented by commanding officers of the corps in each service.

DENTAL ASSISTANTS TO MEET OCTOBER 14 AT MIAMI BEACH

The American Dental Assistants Association will hold its general meeting October 14 in the Roney Plaza Hotel, Miami Beach, Fla., Lucile Black, president, has announced.

Speakers will be Paul Kells, Miami psychiatrist, "The Psychology of Difficult Patients"; M. Don Clawson, president, Meharry Medical College, "Training Dental Assistants"; and Mary B. Merritt, dean of women and professor of English, University of Miami, "Education for Service."

A conference on certification for dental assistants will be held the following day, with the session devoted to discussion of plans for certification and its advantages for dental assistants.

A.D.A. ANNUAL AWARD TO HONOR W. T. G. MORTON

To commemorate the centennial of the first demonstration of anesthesia by William T. G. Morton, the American Dental Association will make its annual award posthumously to Dr. Morton.

The plaque will be given by a representative of the Association to officials of the Massachusetts General Hospital at a ceremonial function October 16 in connection with a three-day celebration, at which alumni of the hospital and members of the various anesthesia societies will be present.

Featured on the three-day program will be a series of symposiums on such topics as surgery, aspects of fundamental nature of the anesthesia process and basic problems of anesthesia.

DENTAL EDUCATION

TUFTS COLLEGE EXPANDS DENTAL PROGRAM FOR 1947

The Tufts College Dental School has expanded its program of studies as the result of a grant from the Kellogg Foundation, according to a recent announcement.

Formal graduate study will be offered in orthodontics and oral pathology during the coming year, and postgraduate study will be offered in these two fields to applicants who do not meet admission requirements for the graduate school, officials said.

Full-time courses in periodontology, denture prosthesis, oral pathology, dentistry for children, roentgenology, operative dentistry and crown and bridge prosthesis will be offered for thirty-two weeks, beginning October 1. Sixteen-week courses, also on a full-time basis, will be given in these subjects beginning October 1 and ending January 25, 1947. Similar courses also will be given two days each week for a sixteen-week period, October 1 to February 4, 1947.

A refresher course in orthodontics is scheduled for two days a week from October 23 to December 5. Enrollment is limited to practitioners who have had graduate or postgraduate work, or who are qualified by experience in the field of orthodontics. Instructors will be Philip E. Adams, Herbert I. Margolis and Oren A. Oliver.

NEW YORK DENTAL ALUMNI PLAN WELCOME FOR NEW DEAN

A dinner of welcome in honor of Walter H. Wright, recently-appointed dean of the College of Dentistry, New York University, will be given October 3 at 7 p.m. at the Waldorf-Astoria Hotel, New York, under the auspices of the Dentistry Alumni Association of the university, F. H. Brophy, chairman, has announced.

WORLD DENTISTRY

DENTAL EQUIPMENT SOUGHT TO RESTORE CLINIC IN GREECE

The American Dental Association has received an appeal for second-hand dental equipment, furniture, clothing or other contributions to help restore a den-

Acme Photo

U.S. Dentists in Amsterdam

Members of the Ivory Cross Expedition, committee of United States dentists in Amsterdam to conduct postgraduate courses in dentistry, are pictured outside the Municipal University, where they were received officially by the Dutch government. Left to right: Herbert Loeb, Cambridge, Mass., former president of the Netherlands Dental Society; E. H. Smith, professor of prosthetic dentistry, University of Pennsylvania; LeRoy M. Ennis, professor of roentgenology, also of the University of Pennsylvania; Earl W. Knapp, former professor in the College of Dentistry, New York University; and Ferdinand G. Neurohr, alumnus of the School of Dentistry, University of Pennsylvania

tal clinic in Greece, which was destroyed by the Germans in December 1943.

Contributions should be sent to Dr. Stavros Anastassiou, 42 Solomou St., Athens, Greece.

NEWFOUNDLAND HOSPITAL REOPENS DENTAL RESIDENCY

The Notre Dame Bay Memorial Hospital at Twillingate, Newfoundland, has reopened dental residency. Further information may be obtained by writing John M. Konopka, 25 West Independence St., Shamokin, Pa.

NORWAY SEEKS BACK ISSUES OF U.S. DENTAL PUBLICATIONS

The Norsk Dental Depot is seeking back-issue dental periodicals from 1942 to 1945 for distribution to Norwegian dentists whose files for these years were disrupted by the war.

Current periodicals are not needed, because Norwegian dentists seeking professional magazines in the English language can now buy their own subscriptions, the Depot pointed out. Contributions should be sent to Norges Tannlaegehogskole, Gjetemyrsveien 69, Oslo.

DENTISTS NEEDED BY UNRRA FOR RELIEF WORK IN CHINA

The United Nations Relief and Rehabilitation Administration is in need of at least fourteen practicing dentists for relief work in China, it was announced recently by A. Hughes Bryan, of the UNRRA.

All dentists interested are urged to write Dr. A. Hughes Bryan, 1344 Connecticut Ave., Washington 25.

DENTAL SOCIETIES

WEST COAST DENTISTS TO HOLD MEDICINE SEMINAR OCTOBER 6-11

The West Coast's third annual Seminar of Dental Medicine will be held in Palm Springs, Calif., October 6-11, according to a recent announcement.

Sponsored by all Pacific Coast state dental associations from Southern California to British Columbia, the five-day session will include lectures and discussions on dermatology, hematology, pharmacology, growth and development of the skull, physiology and pathology of bone, physiology and pathology of the parathyroids, caries prevention and research, and dental medicine.

Among those scheduled to present papers are: John Brauer, Los Angeles; Harold Copp, University of California; Arthur C. Curtis, University of Michigan; H. Trendley Dean, U. S. Public Health Service, Washington; Philip Jay, University of Michigan; F. R. Keating, Jr., Mayo Foundation; Robert G. Kesel, University of Illinois; William B. Ryder, University of California; M. H. Seevers, University of Michigan; Harry Sicher, Loyola University, Chicago; and Wendell L. Wylie, University of California.

Attendance is limited to 200, and applicants must present proof that they have had at least two postgraduate courses within the year.

NATIONAL BOARDS

52 CANDIDATES PASS PART 2 OF NATIONAL BOARD EXAMINATIONS

Fifty-two candidates successfully passed Part 2 of the National Board examinations given April 22-23, the National Board of Dental Examiners announced August 22.

Among successful candidates were: G. Robert McLean, George Mazur and Anton Jacob, Baltimore College of Dental Surgery, University of Maryland; Norman E. Alderman and Donavon Garehime, Chicago College of Dental Surgery, Loyola University; Robert M. Ricketts, School of Dentistry, Indiana University; and Wilbur Ediger, Hugh T. Moore, Francis O. Stalker and Edmund Wong, Kansas City-Western Dental College, School of Dentistry, University of Kansas City.

Others who passed Part 2 were: Robert D. Korte, Irving H. Gordon, John W. Gibbs, John C. Hardin, Jr., Manuel J. Kaplan, William B. Kovacs, Herbert G. Kron, Richard A. Walle, Robert M. Wilhelmi, Hubert Preston, Jr., Earl R. McCallon, Robert M. Booth, Irving Sheen and Charles Sawicki, School of Dentistry, Loyola University; Saul Goldstein, Michael M. Nawfel and Hector Bethart, Tufts College Dental School; Nelson D. Large, School of Dentistry, Medical College of Virginia; and Cyril L. Fabio and Daniel W. Roman, School of Dentistry, Meharry Medical College.

The list also included: Lester H. Steinholtz, Herbert Weissbach, Leon J. Fleischman, Herbert A. Fleischman, Robert S. Landsman and Seymour Levin, College of Dentistry, New York University; Charles B. Gillingham, Max Ray Johnson, Charles P. Dowsett, Robert W. Hobson, Lawrence Ho, Gerald B. Hoffmaster, Richard L. Hoffman, Charles E. Oxar, Jr., Ted F. Pett, Edwin R. Black, Douglas C. Wendt, Kent

W. Jones, Philip C. Martin and Clyde W. Ulrich, Dental School, Northwestern University; Gerald P. Larson, College of Dentistry, State University of Iowa; and Melvin A. Andell, Thomas W. Evans Museum and Dental Institute School of Dentistry, University of Pennsylvania.

Robert R. Gillis is chairman of the board of examiners and Gordon L. Teall, secretary.

NATIONAL DENTAL EXAMINERS POSTPONE SESSIONS TO JANUARY

The National Board of Dental Examiners will hold its next examinations of candidates in Parts 1 and 2 in schools where there are five or more candidates January 13-14 and April 21-22.

The examinations originally were set for September 9-11, but the dates were changed because of a general discontinuance of accelerated programs in dental colleges, Gordon L. Teall, secretary, said.

Applications should come through the office of the dean. Further information may be obtained by writing Dr. Teall at Box 71, Hiawatha, Kan.

EASTON ELECTED TO HEAD MAINE DENTAL EXAMINERS

Arthur W. Easton, Norway, was named president and Raymond A. Derbyshire, Skowhegan, secretary, when the Maine Board of Dental Examiners held its annual meeting in Augusta June 30 and July 1.

GENERAL NEWS

CHICAGO ADDS THREE CLINICS FOR CHILDREN OF PRESCHOOL AGE

The Chicago Council of Social Agencies has inaugurated three experimental dental clinics for preschool children at Chicago nursery schools. The project is being carried out in cooperation with the Chicago Dental Society.

Two of the clinics are being operated by the Chicago Board of Health—one at the Mary Crane Nursery at Hull House, famed west side settlement house, and the other at the Ida B. Wells housing project on the south side. The third is operated by the Salvation Army at 426 West Wisconsin St.

Lon W. Morrey, director of the Bureau of Public Relations of the American Dental Association, is chairman of the committee in charge of the project.

At each of the "pilot" clinics, complete records are being maintained regarding cost, total amount of service and other data which will be utilized in planning extension of similar clinic service to greater numbers of preschool children in Chicago.

Service provided at the clinics includes diagnostic roentgenograms, fillings, extractions and prophylaxes. Re-examinations are conducted at intervals of not less than four months. Emphasis is also being placed on education of parents and teachers on the importance of early and continuous dental care.

COMPILE CATALOG OF MEDICAL PERIODICALS

The International Association of Medical Press has under preparation a catalog which will contain information about all medical periodicals, those published currently as well as those discontinued.

Editors can cooperate by sending the following information to Santo Vanasia, editor, Via Macchi 71, Milan, Italy: year founded, number of pages, yearly number of issues, names of editors, languages used in text, place of publication, subscription rate (domestic and foreign) and types of articles published. This information should be transcribed into Latin characters and Arabic numerals, the association said.

COUNCIL ON DENTAL EDUCATION

GRADUATE, POSTGRADUATE AND REFRESHER COURSES OFFERED BY THE DENTAL SCHOOLS AND BY THE WAR AND NAVY DEPARTMENTS, 1946-1947

THE Council on Dental Education of the American Dental Association has compiled this pamphlet especially for the information of veterans who may be interested, upon their return to civilian life, in the pursuit of graduate, postgraduate or refresher courses in the dental schools. These three types of courses are defined by the Council as follows:

1. *Graduate* courses may be defined as advanced courses planned for those especially prepared and qualified to do advanced study beyond the undergraduate level. The work done in such courses is of a character acceptable to the graduate school of the university and leads to a degree upon the completion of the requirements as specified by the graduate school; these requirements include individual research and the preparation of a thesis. The objects of such courses are to fit individuals for a specialty, for teaching or for research.

2. *Postgraduate* courses in dentistry may be defined as special courses pursued intensively and exhaustively by students who are graduates in dentistry. The outlines of such courses should incorporate planned instruction in background work, such as science, laboratory and didactic classes, with the clinical work in a special field. Postgraduate courses do not lead to a degree but may be rewarded by a certificate of proficiency and may lead to a specialty.

3. *Refresher* courses may be defined as short courses in clinical practice designed for the purpose of reviewing those clinical procedures learned and of refreshing those performance skills developed by the student in the undergraduate curriculum; such courses, while emphasizing instruction in new technics and improved clinical procedures, should include also a review of the literature and should require some organized formal study. They should refresh especially the students' use of basic procedures in the art of practice but should be extended to include advanced instruction in new knowledge relating to the basic sciences and their applications. They may be offered in residence or as extension projects; they do not earn credit toward a degree or lead to certification. They are not designed to equip the student for a specialty.

The Council sought information from all the schools touching courses available in these three fields and reports this information, substantially as it was received, by states in which the schools are located arranged in alphabetical order. Additional information may be secured by addressing the dean in each case.

Compiled and edited by Harlan H. Horner, secretary of the Council on Dental Education.

California

School of Dentistry, College of Physicians and Surgeons, San Francisco 3, Ernest G. Sloman, Dean.

Refresher course in children's dentistry: This course is given two and sometimes three times a year. The next beginning dates are October 1, 1946, and April 1, 1947. A refresher course of one week's duration affording fifty-three hours of lectures, demonstrations and clinical work performed by the staff of teachers and the registrants. The course is designed to teach dentists proven technics in this important field of practice. Classes are limited to nine registrants. The tuition fee is $50.

College of Dentistry, University of California, San Francisco 22, Willard C. Fleming, Dean.

Graduate courses: Under the administration of the graduate school; designed as preparation for dental research and teaching; leads to M.S. degree; minimum of twenty units of graduate work with major work in basic science and research. Few or no clinical courses. The M.S. is granted by the University and is not an M.S. in dentistry. Most of the credit is obtained in the College of Dentistry, although graduate courses may be obtained in the basic science department of the University. Graduate work is offered in all major fields.

Postgraduate courses: Under the direction of the College of Dentistry; designed as preparation for a specialty (academic legislation now in process to lead to a certificate). Emphasis on clinical phases offered in major clinical divisions. May be one, two or three academic terms.

Orthodontics: Class begins July 1, 1947; applications must be filed prior to April 15, 1947; limited to four students. Full time, no private practice; three academic terms. Must take examination for entrance.

Orofacial prosthesis: Class begins September 17 and March 1. Full term, sixteen weeks.

Denture prosthesis: Class begins September 19, 1946; limited to one student. Full time; three academic terms. Must take examination for entrance.

Dental medicine: Class begins September 1946. Full time, no private practice, three academic terms. Must take examination for entrance.

Refresher courses: Designed to bring a dentist up to date in a single field; short intensive courses from one to eight weeks; offered in major division.

Orofacial prosthesis: Begins September 1946; limited to four students, half time, eight weeks. This refresher course is prerequisite to registration for postgraduate work in this field.

Dental roentgenology: Given at frequent intervals. Two types of refresher courses—dentists and dental hygienists. May be group courses limited to twelve students or individual courses that offer more extensive instruction. Course given over a two-week period.

Periodontia: Class begins November 1, 1946; forty hours of instruction over a period of six weeks; clinic and theory. Second course in Summer Session II, July 1, 1947.

Exodontia: 808A. Two half days a week for sixteen weeks. Class begins September 19 and March 1. Refresher course in Exodontia 808B begins in Summer Session I, July 1, 1947; two half days a week for six weeks. Lectures and clinical practice.

General costs: Postgraduate and graduate courses per term: tuition $150, incidental fee $18, breakage and locker fee $5, laboratory and clinic fee $10. There is a nonresident fee of $75 per term. There are small special fees for late registration, etc. Other expenses include materials and supplies. Health and hospitalization service is provided for the regularly registered full-time postgraduate and graduate student.

Fees for refresher courses are dependent upon the length of instruction, materials, etc., and are set up for each course.

College of Dentistry, University of Southern California, Los Angeles 15, Julio Endelman, Dean.

Graduate course: A graduate course in orthodontics is offered leading to the degree of Master of Dental Science in Orthodontics. The course requires either two calendar years of half-time attendance or one calendar year of full-time attendance. The tuition fee is $600.

No postgraduate refresher courses are offered at this time.

District of Columbia

School of Dentistry, Georgetown University, Washington 7, John P. Burke, Dean.

Refresher courses: Refresher courses will

be offered in operative dentistry, crown and bridge prosthesis and prosthetic dentistry. Tentative plans provide for the opening of these courses in November 1946 and in May 1947. Each course will have a duration of six weeks and the fee will be $90.

College of Dentistry, Howard University, Washington 1, Russell A. Dixon, Dean.

Postgraduate and refresher courses: Postgraduate and refresher courses, two weeks and four weeks in length, will be offered beginning September 30. These courses will be repeated during the academic year if demand for them continues. The tuition of the two-week course is $50 and of the four-week course $100. It may be necessary to limit the number admitted. The fields to be covered are operative dentistry, crown and bridge prosthesis, full dentures, oral surgery, root canal therapy and periodontia. In addition, courses in orthodontics four weeks and eight weeks in length and a general course in clinical dentistry covering eleven weeks will be offered.

Georgia

School of Dentistry, Emory University (Atlanta-Southern Dental College), Atlanta 3, Ralph R. Byrnes, Dean.

Refresher courses: Refresher courses of a general nature for graduates in dentistry are offered. A student may enter a regular session at any time and build a schedule of his own choice and may remain for two weeks, a month or an entire session. The tuition is prorated on the basis of the annual fee.

The following intensive courses have been devised for presentation during the summer months between regular sessions, subject to sufficient demand on the part of graduate dentists to warrant the presentation of a particular course: dentistry for children, one week, $55; operative dentistry, one week, $55; crown and bridge prosthesis, three weeks, $120; full denture prosthesis, one week, $60.

Additional information regarding these special courses may be obtained by addressing Dr. L. B. Brown, Director of Refresher Courses.

Illinois

School of Dentistry of Loyola University, Chicago College of Dental Surgery, Chicago 12, Robert W. McNulty, Dean.

Refresher courses: The school will be prepared, beginning October 14, 1946, to offer refresher courses in the subjects of full denture prosthesis, crown and fixed bridge prosthesis, operative dentistry, oral surgery and periodontia. The five courses will be taught on two half days a week each, for a period of ten weeks, until December 20, 1946. Full denture prosthesis will be taught on Monday mornings and Wednesday afternoons, crown and fixed bridge prosthesis on Wednesday mornings and Friday afternoons, operative dentistry on Monday afternoons and Thursday mornings, oral surgery on Tuesday and Friday mornings and periodontia on Tuesday and Thursday afternoons.

The class in each of these subjects will be limited to ten students. The work in each course will be devoted to the single subject and will consist of both classroom and clinical instruction. Tuition and fees for each of these courses are $65; for all five courses, $300. Instruments and supplies are to be furnished by the student. Any ethical dentist is eligible for enrollment in these courses. Since the size of the classes is limited, however, preference will be given to dentists returning from military service.

Graduate study at the dental school is in the process of revision at the present time. Courses of graduate study will be announced at a later date.

Dental School, Northwestern University, Chicago 11, Charles W. Freeman, Dean.

Graduate courses: Graduate courses leading to the degree of Master of Science in Dentistry are offered for the academic year October 1946 to June 1947 in oral surgery, pedodontia, periodontia, preventive dentistry and prosthetic dentistry. A graduate course in orthodontics extends from October 1946 to September 1947. The fee for graduate courses is $510, which includes the tuition fee and use of instruments and equipment. At the date of this announcement, the graduate courses are all filled.

Postgraduate courses: Shorter postgraduate courses will be scheduled after January 1, 1947, in various subjects.

College of Dentistry, University of Illinois, Chicago 12, Allen G. Brodie, Acting Dean.

Graduate courses: Graduate courses leading to the degree of Master of Science are

offered as usual for the academic year 1946-1947 in orthodontia, applied materia medica and therapeutics, histology and oral pathology. The tuition fee in the Graduate School is $12 per unit for residents of Illinois and $24 per unit for nonresidents. A new graduate course in pedodontics will be offered on September 9, 1946, to meet the needs of practitioners who wish to specialize in the practice of dentistry for children. This course will offer full training in basic technics, basic sciences and clinical practice. For further information about this new course, inquiries should be addressed to Dr. Maury Massler, 808 South Wood St., Chicago 12.

Postgraduate course: A twelve-week general refresher and postgraduate course will be offered for the period beginning on September 9, 1946, and will be repeated beginning January 6, 1947. This course is offered with the aid of a grant from the W. K. Kellogg Foundation.

The course is designed primarily for returning veterans whose dental practice in the armed forces was limited to certain phases of dentistry and who wish to obtain a short but intensive training in the principal fields of dentistry with special emphasis on the latest clinical and therapeutic advances. This course will be particularly valuable for dental officers whose undergraduate training was shortened by the accelerated wartime schedule and for those who are planning to continue later in advanced training in special clinical fields after the completion of the refresher course.

Provision will be made for rotating instruction through the clinical fields. The curriculum will include didactic and clinical instruction in operative dentistry, crown and bridge, full and partial dentures, root-canal therapy, periodontia, children's dentistry and oral surgery. In addition, the recent biologic and medical advances of dentistry will be presented in a basic course of lectures and seminars by authorities in their particular fields. This will include a consideration of chemotherapy, oral bacteriology, fluoride therapy, diet and nutrition, oral diagnosis and correlated fields.

Registration will be limited to thirty-six men. Veteran dental officers will be given preference but civilian dentists are eligible. The registration date is September 7. Tuition fee is $75 for residents of the state of Illinois, $150 for nonresidents. This course comes under the provisions of the G. I. Bill of Rights. Veterans, if on terminal leave or already separated from the service, must present their "Certificate of Eligibility and Entitlement" from the Veterans Administration when they register.

Applications for this course will be considered in the order in which they are received. For further information, inquiries should be addressed to Dr. Isaac Schour, Associate Dean in Charge of Postgraduate Studies, 808 South Wood St., Chicago 12.

Indiana

School of Dentistry, Indiana University, Indianapolis 2, Maynard K. Hine, Dean.

Refresher courses: A series of refresher courses was offered during the summer of 1946 including denture prosthesis, pedodontics, oral surgery and general dentistry. The course in general dentistry covered various phases of the general practice of dentistry including instruction in denture prosthesis, pedodontics, oral surgery, periodontia, operative dentistry and crown and bridge prosthesis.

If the demand justifies it, all of the abovementioned courses will be repeated during the academic year 1946-1947 beginning October 2, 1946. To these courses may be added courses in periodontia, crown and bridge prosthesis and operative dentistry. During the academic year these courses will be on both a full-time and part-time basis. The fee for these courses will depend upon the length of time planned for the individual student. All classes will be open to veterans and other dentists and will be limited in size.

Iowa

College of Dentistry, State University of Iowa, Iowa City, Alvin W. Bryan, Dean.

Graduate courses: Graduate courses leading to the degree of Master of Science are offered in orthodontics and pedodontics. At the date of this announcement, there are no vacancies in the graduate class in orthodontics until after January 1948. These courses require from one to one and one-half years for the degree. Upon completion of one year, a certificate is granted and the Master of Science degree is awarded when the work is fully accomplished. The tuition fee for

residents of Iowa is $112 per semester; for nonresidents $144 per semester.

Refresher courses: Basic refresher courses of six weeks in length will be offered during the academic year 1946-1947 in denture prosthesis, crown and bridge prosthesis, pedodontia, operative dentistry, periodontia and roentgenology. Students may enter at any date from October 7, 1946, to April 21, 1947.

Registrants will be assigned to the infirmary for clinical work in the subjects chosen, and patients will be made available to them. In addition to clinical practice, lectures and demonstrations will be arranged as found necessary by the departments concerned. Students may register for a "general clinical course," in which case they are privileged to attend regularly scheduled lectures of the undergraduate curriculum, as they choose, and to select clinical cases under any department. The size of refresher classes will be limited. The tuition fee is $50.

Kentucky

School of Dentistry, University of Louisville, Louisville 2, Raymond E. Myers, Dean.

Refresher courses: Beginning on January 3, 1947, refresher courses in general clinical dentistry will be offered. The student may choose to concentrate on one subject or to take a review course involving a variety of subjects. While instruction will include both lectures and demonstrations, the student will be permitted to engage in actual clinical practice. Insofar as it is practicable, the time of admission, duration of the course and schedule of hours will be arranged to meet the student's requirements and convenience. Enrollment will be limited in order that no more than five students will be engaged in study at any one time.

Louisiana

School of Dentistry, Loyola University, New Orleans 15, Thomas D. Speidel, Dean.

No graduate or postgraduate courses are offered, and no plans for refresher courses are ready for announcement.

Maryland

Baltimore College of Dental Surgery, University of Maryland, Baltimore 1, J. Ben Robinson, Dean.

Postgraduate courses: Postgraduate courses in oral surgery and orthodontics leading to a certificate are offered.

Refresher courses: Refresher courses are offered from time to time in operative dentistry, prosthetic dentistry, crown and bridge prosthesis, radiodontia, oral diagnosis, oral surgery and the basic sciences.

Massachusetts

Harvard School of Dental Medicine, Harvard University, Boston 15, Alfred LeRoy Johnson, Administrative Officer.

Inquiries should be addressed to the Administrative Officer.

Tufts College Dental School, Boston 15, Basil G. Bibby, Dean; John T. O'Rourke, Director of Postgraduate Studies.

Graduate courses: Graduate courses leading to the degree of Master of Science are offered in orthodontics and oral pathology. These courses extend to a period of eighteen months. The tuition is $650 per term of nine months. Courses twelve months in length are also offered in these fields leading to a certificate. The tuition is $850.

Postgraduate courses: Postgraduate courses are offered in periodontology, denture prosthesis, oral pathology, crown and bridge prosthesis, dentistry for children, radiology and operative dentistry for three groups of students as follows:

(1) Two days per week for sixteen weeks beginning October 1, 1946, and February 4, 1947.
(2) Full time for sixteen weeks, October 1, 1946, to February 4, 1947.
(3) Full time for thirty-two weeks, beginning October 1, 1946.

Refresher courses: Refresher courses are offered on a one-day-per-week basis as follows: minor oral surgery, beginning October 8, 1946 (eight weeks); periodontology, beginning October 16, 1946 (twelve weeks); full denture prosthesis, beginning October 28, 1946 (six weeks); prevention and control of oral disease, beginning May 6, 1946 (six weeks); dentistry for children, beginning December 2, 1946 (twelve weeks); radiology, beginning January 6, 1947 (eight weeks); operative dentistry, beginning January 8, 1947 (ten weeks); crown and bridge prosthesis, beginning January 28, 1947 (eight weeks); periodontology, beginning February 5, 1947

(twelve weeks); full denture prosthesis, beginning April 1, 1947 (six weeks).

In addition, a course in orthodontics, limited to practitioners who have had training in orthodontics, will be offered on a two-day-per-week basis for four weeks beginning October 23, 1946; a course in prevention and control of oral disease on a full-time basis for one week beginning February 10, 1947; and a course in dentistry for children on a full-time basis for two weeks beginning April 7, 1947.

The Tufts College Dental School and the Massachusetts Dental Society are planning the establishment of four additional postgraduate centers throughout the state. The purpose of these centers is to make postgraduate and refresher work readily accessible to dental practitioners. The courses offered at the centers will be conducted over three-day periods beginning at 1:30 p. m. and carrying through into the evening. It is planned to offer four courses at each center during the year. Thus in three or four years practitioners will be able to cover most of the divisions of general practice.

Michigan

School of Dentistry, University of Detroit, Detroit 26, René Rochon, Dean.

No graduate, postgraduate or refresher courses are offered at this time.

School of Dentistry, University of Michigan, Ann Arbor, Russell W. Bunting, Dean; W. K. Kellogg Foundation Institute, Graduate and Postgraduate Dentistry, Paul H. Jeserich, Director.

Graduate courses: For those who wish to acquire a foundation for teaching or research and for those who desire to qualify as specialists in some branch of dentistry, the Graduate School of the University offers courses leading to the degree of Master of Science in Dentistry. It is not intended that work leading to this degree shall be denied to those who engage in clinical practice, but it is offered more especially to assist men to obtain a broader training in special phases of dentistry in preparation for teaching or research careers, diagnostic work in hospitals or in groups of medical practitioners or in the preparation for specialties where a specific training is required.

Only those applicants who have shown unusual ability and who in their undergraduate courses have earned an average grade of B will be admitted to the graduate courses. A curriculum of study for the Master of Science degree will be arranged by a committee to meet the needs of the individual candidate and to prepare him for the particular objective in view. The requirements for the master's degree are a minimum of twenty-four semester hours of credit, of which six to eight hours may be allowed for clinical work. Since in many states thirty semester hours of credit are required for accreditation to practice of the specialties, those who intend to practice in such states are urged to complete thirty hours. The degree of Master of Science in Public Health regularly requires thirty hours of credit.

A candidate for the master's degree should submit to the postgraduate committee detailed transcripts of preprofessional and professional work and other information which will aid in determining his eligibility and in formulating a suitable program of studies. If the candidate's credentials are acceptable, he will be referred to the dean of the Graduate School for approval of his admission and study program.

Graduate work leading to the Master of Science degree is offered in the following fields: complete denture prosthesis; crown and bridge prosthesis; dental therapeutics; dentistry for children; materials; oral pathology and diagnosis; oral surgery; operative dentistry; orthodontics; partial denture prosthesis; preventive dentistry and periodontia; public health dentistry; root surgery, radiographic diagnosis and management of periapical infections.

Graduate fees: Full time, Michigan students, $140; nonresidents, $225. Six hours or less, Michigan students, $75; nonresidents, $125.

No applicant is accepted for enrollment for graduate study unless registered on a one-half time basis.

Postgraduate courses, 1946-1947: A series of short, intensive postgraduate courses has been arranged for returning veterans. These courses can be elected as single units or in sequensive groups of from two to fourteen weeks. Each unit course program consists of lectures, seminars, demonstrations and clinical practice in its respective field of

dentistry. These units vary in length from one to four weeks as signified by the dates in the sequensive outline of courses. Each one of these unit courses is limited to not more than twelve students. All applications must be received at least six weeks in advance of the beginning date of the course, but, to be assured of acceptance, it is advisable to make application as far in advance as possible.

Postgraduate Fees	*Michigan Students*	*Non-residents*
Full time	$140	$225
Half time	75	125
One-day-a-week course	75	125
Two-week course	75	125
One-week course	40	65
One-week course (dental assistants)	20	30
One-week course (dental assistants—radiodontics)	20	30

Fees for a sequensive grouping of units will be the total of the unit fees.

Refresher courses: Refresher courses extending over one and two weeks will be offered as follows:

1946: September 23-October 4, complete denture prosthesis; October 14-25, partial denture prosthesis; October 28-November 8, oral pathology; October 28-November 8, operative dentistry; November 11-22, crown and bridge prosthesis; November 11-22, oral surgery (minor); December 2-13, crown and bridge, precision attachment bridgework;* December 2-13, dentistry for children; December 2-13, periodontia; December 2-13, root canal surgery; December 16-20, operative and interpretative radiodontics.

1947: January 13-24, complete denture prosthesis; January 13-24, orthodontics for the general practitioner; January 13-17, dental therapeutics; January 20-24, ceramics; January 27-February 7, operative dentistry; January 27-February 7, partial denture prosthesis; February 10-21, crown and bridge prosthesis; February 10-21, oral pathology; February 24-March 7, oral surgery (minor); February 24-March 7, dental caries control; March 10-21, periodontia; March 10-21, root canal surgery; March 24-April 4, operative dentistry; April 21-25, operative and interpretative radiodontics; April 28-May 9, partial denture prosthesis; April 28-May 9, crown and bridge prosthesis; May 12-23, dentistry for children; May 12-23, complete denture prosthesis; May 12-23, oral surgery (minor); May 26-June 6, root canal therapy; May 26-June 6, orthodontics for the general practitioner; April 28-May 2, dental assistants course; May 5-9, dental assistants and hygienists x-ray course.

Fees	*Michigan Residents*	*Non-residents*
One-week units	$ 40	$ 65
Two-week units	75	125
Crown and bridge, precision attachment bridgework	100	150
Dental assistants and dental assistants and hygienists x-ray courses	20	30

One-day-a-week courses will be offered as follows:

Complete denture prosthesis:

Tuesdays: October 15, 22, 29, November 5, 12, 19, 26, December 3, 10, 17.

Fridays: October 18, 25, November 1, 8, 15, 22, 29, December 6, 13, 20.

Tuesdays: February 11, 18, 25, March 4, 11, 18, 25, April 1, 15, 22.

Fridays: February 14, 21, 28, March 7, 14, 21, 28, April 4, 18, 25.

Crown and bridge prosthesis:

Thursdays: October 3, 10, 17, 24, 31, November 7, December 5, 12, 19, January 9, 16.

Thursdays: January 23, 30, February 6, 27, March 6, 13, 20, 27, April 3, 17, 24.

Dentistry for children:

Wednesdays: February 12, 19, 26, March 5, 12, 19, 26, April 2, 16, 23, 30, May 7.

Operative dentistry:

Fridays: October 4, 11, 18, 25, November 15, 22, December 6, 13, 20, January 10, 17.

Fridays: February 14, 21, 28, March 7, 14, 21, April 18, 25, May 2, 9, 16, 23.

Oral surgery (minor):

Mondays: October 7, 14, 21, 28, November 4, 25, December 2, 9, 16, January 13, 20.

Thursdays: October 10, 17, 24, November 14, 21, December 5, 12, 19, January 9, 16, 23.

Mondays: February 10, 17, March 10, 17, 24, 31, April 14, 21, 28, May 5, 26.

Thursdays: February 13, 20, March 13, 20, 27, April 3, 17, 24, May 1, 8, 29.

*This course will be presented under the supervision of Drs. Albert L. LeGro and Avery A. Bartlett. Priority in registration will be given to those who have taken postgraduate courses in either operative dentistry or crown and bridge prosthesis.

Partial denture prosthesis (to be elected on two-term basis):

Tuesdays: October 1, 8, 29, November 5, 12, 19, 26, December 3, 10, 17, January 7, 14.

Tuesdays: February 11, 18, 25, March 4, 11, 18, 25, April 1, 15, 22, May 13, 20.

*Periodontia** (to be elected on two-term basis):

Wednesdays: October 9, 16, 23, 30, November 6, 13, 20, 27, January 8, 15, 22, 29.

Wednesdays: February 12, 19, 26, March 5, 26, April 2, 16, 23, 30, May 7, 14.

*Root canal surgery**:

Wednesdays: October 9, 16, 23, 30, November 6, 13, 20, 27, January 8, 15, 22, 29.

Wednesdays: February 12, 19, 26, March 5, 26, April 2, 16, 23, 30, May 7, 14.

Fees: One-day-a-week unit, Michigan residents, $75; nonresidents, $125. Fees for two or more days will be proportionate.

Minnesota

School of Dentistry, University of Minnesota, Minneapolis 14, William H. Crawford, Dean.

Graduate courses: Graduate courses leading to the degree of Master of Science in Dentistry, open to a limited number of students, are offered in oral surgery, pedodontia, prosthetics, crown and bridge prosthesis, orthodontia, operative dentistry, periodontia and oral diagnosis. The approximate time required to secure the degree is from two to three years. The courses are administered under the direction of a joint committee in dentistry and medicine in the Graduate School. Five teaching fellowships which involve teaching and graduate study are available.

Postgraduate and refresher courses: Postgraduate and refresher courses will be offered on a two-week basis, one each quarter, in periodontia, gold foil and amalgam, inlay, oral surgery and exodontia, oral and maxillofacial surgery, crown and bridge prosthesis, dentistry for children, complete denture service and partial denture service.

A one-week course each quarter will be offered in root canal therapy and a course over a longer period in orthodontia.

*Students in this course are given the privilege of attending any lecture (not clinic) in the two-week course in this field given during the period of their enrollment.

These courses will begin about October 1, 1946. A grant from the W. K. Kellogg Foundation makes it possible to include both didactic and clinical work in the instruction. The classes will be limited to from eight to ten students, and board and room will be available on the campus in the Center for Continuation Study. The fee for the two-week course will be $25 per week.

Individual programs may be set up so that a dentist may select a varied program, doing exactly what he wishes to do in the way of clinical work and staying as long as he wishes.

Missouri

School of Dentistry, Kansas City-Western Dental College, University of Kansas City, Kansas City 6, Roy J. Rinehart, Dean.

Graduate courses: Graduate courses leading to the degree of Master of Science in Dentistry are offered in orthodontics and in preventive dental medicine. These courses will ordinarily require from two to three semesters for completion. Two teaching assistantships ($750 annually) are usually available for students who are candidates for the master's degree.

Postgraduate course: A postgraduate course in orthodontics covering from one to three semesters is offered for those who desire to specialize but do not seek an advanced degree.

Refresher courses: Refresher courses two weeks in length and limited to ten students will be offered in the summer of 1947 in full denture prosthesis, partial denture prosthesis, crown and bridge prosthesis and operative dentistry.

School of Dentistry, St. Louis University, 3556 Caroline St., St. Louis 4, L. R. Main, Dean.

Extensive alterations in the clinical building in process at the time of this announcement prevent the establishment of a postgraduate program. It is hoped that announcement may be made by January 1, 1947, of refresher courses in prosthetic dentistry, crown and bridge prosthesis and a combination course in roentgenology and pathology.

School of Dentistry, Washington University, 4559 Scott Ave., St. Louis 10, Otto W. Brandhorst, Dean.

Postgraduate courses: Postgraduate courses

covering a full year (twelve months), designed especially for returning servicemen, are offered in dental medicine, dental pediatrics and orthodontics, dental and oral surgery and restorative dentistry. The tuition is $520 for the year. A certificate of attendance is granted upon the completion of the course.

Refresher courses: Refresher courses, covering one to two weeks, are offered at various times during the year in radiodontics, dental pediatrics, complete denture prosthesis, partial denture prosthesis, oral surgery, operative dentistry and dental medicine and diagnosis. The tuition is $50 per week. A series of courses is also planned on a one-half day per week basis, extending over several months. Dates and hours will be furnished upon application.

Nebraska

School of Dentistry, Creighton University, Omaha 2, Herbert E. King, Dean.

Refresher courses: With a minimum of two weeks' attendance, a review of the subject of full denture construction is offered to graduate dentists. This would be expected to cover the fundamentals by conference with the instructors and one or more practical cases carried on under close supervision. The outline course here suggested is subject to adjustment to individual needs and may be expanded if more time is available. Further courses in partial denture methods might be given on demand.

Full dentures: Two weeks. Two hours in conference on patient diagnosis, mouth examination and review of patients in the clinic. A patient assigned and steps as outlined carried through by the student dentist under supervision. A conference and round table with instructors on the case after completion. If more time is taken for the course, a suggested procedure would be the construction of a full upper and lower lingual bar denture.

General operative procedures: A course with an attendance of from two to four weeks will be offered with the object of giving to graduate students an opportunity to refresh their methods of diagnosis, x-ray and the various restorative and operative procedures. Special attention will be offered those desiring individual attention in gold foil restorations.

College of Dentistry, University of Nebraska, Lincoln 8, Bert L. Hooper, Dean.

Refresher courses: Refresher courses covering two weeks are offered from time to time in operative dentistry, prosthetic dentistry, oral surgery and dentistry for children. When six applications have been received for any one of the courses, a date is set for it.

New York

School of Dental and Oral Surgery, Faculty of Medicine, Columbia University, New York 32, W. C. Rappleye, Dean; Bion R. East, Associate Dean for Dental and Oral Surgery.

Postgraduate courses: Postgraduate courses leading to a certificate in training are offered in general restorative dentistry, orthodontics and oral surgery. The October 1946 class in orthodontics has been filled, and applications are being received for the class starting in April 1947. The September 1946 oral surgery class has been filled, and applications are being received for the class starting in September 1947.

Refresher courses: The following refresher courses will be offered during the academic year 1946-1947. Subject to withdrawal or change. The number of students admitted to each class is limited.

D.P. 401: *Applied anatomy of the head and neck:* Five two-hour sessions offered at intervals during the year. Fee $40.

D.P. 402: *Crown and bridge:* Two three-hour sessions per week from October 14, 1946, to May 31, 1947, inclusive. Fee $240.

D.P. 402A: Four three-hour sessions per week for fifteen weeks. Hours to be arranged. Fee $240.

D.P. 402B: Six three-hour sessions per week for ten weeks. Hours to be arranged. Fee $240.

D.P. 402C: Ten three-hour sessions per week for six weeks. Full time. Fee $240.

D.P. 403: *Diagnosis:* Two-hour sessions Monday to Friday, November 11-22, 1946. Fee $80.

D.P. 404: *Operative dentistry:* Two three-hour sessions per week, October 14, 1946, to May 31, 1947. Hours to be arranged. Fee $240.

D.P. 404A: Four three-hour sessions per week for fifteen weeks. Hours to be arranged. Fee $240.

D.P. 404B: Six three-hour sessions per week for ten weeks. Full time. Fee $240.

D.P. 404C: Ten three-hour sessions per week for six weeks. Full time. Fee $240.

D.P. 405: Two weeks. Full time. Fee $80.

D.P. 406: *Pulp canal therapy:* Two three-hour sessions per week, October 14, 1946, to May 31, 1947. Wednesday and Friday afternoons. Fee $240.

D.P. 407: *Advanced pathology:* Two three-hour sessions per week, July 8 to November 23, 1946. Monday and Saturday afternoons. Fee $160.

D.P. 407A: Two three-hour sessions per week, January 6 to May 24, 1947. Monday and Saturday afternoons. Repetition of D.P. 407. Fee $160.

D.P. 408: *Pedodontics:* One three-hour session per week, October 12, 1946, to May 31, 1947, inclusive. Fee $120.

D.P. 408A: Two three-hour sessions per week for fifteen weeks, October 14, 1946, to May 31, 1947, inclusive. Fee $120.

D.P. 409: *Periodontology:* Two weeks, full time, June 2 to 13, 1947, inclusive. Fee $150.

D.P. 410: One three-hour session per week (Wednesdays) October 16, 1946, to May 14, 1947, inclusive. Fee $150.

D.P. 411: *Surgical and maxillofacial prosthesis:* Two three-hour sessions per week, October 14, 1946, to May 31, 1947. Fee $240.

D.P. 411A: Four three-hour sessions per week for fifteen weeks. Hours to be arranged. Fee $240.

D.P. 411B: Six three-hour sessions per week for ten weeks. Hours to be arranged. Fee $240.

D.P. 411C: Ten sessions per week full time for six weeks. Fee $240.

D.P. 412: *Full dentures:* Two three-hour sessions per week, October 14, 1946, to May 31, 1947, inclusive. Fee $240.

D.P. 412A: Four three-hour sessions per week for fifteen weeks. Hours to be arranged. Fee $240.

D.P. 412B: Six three-hour sessions per week for ten weeks. Hours to be arranged. Fee $240.

D.P. 412C: Ten three-hour sessions per week, full time, for six weeks. Fee $240.

D.P. 413: *Partial dentures:* Two three-hour sessions per week, October 14, 1946, to May 31, 1947, inclusive. Fee $240.

D.P. 413A: Four three-hour sessions per week for fifteen weeks. Hours to be arranged. Fee $240.

D.P. 413B: Six three-hour sessions per week for ten weeks. Hours to be arranged. Fee $240.

D.P. 414: *Research methods:* Two three-hour sessions per week, October 14, 1946, to May 31, 1947, inclusive. Fee $180.

D.P. 414A: Four three-hour sessions per week, October 14, 1946, to May 31, 1947, inclusive. Fee $250.

D.P. 414B: Six three-hour sessions per week, October 14, 1946, to May 31, 1947, inclusive. Fee $300.

D.P. 415: *Oral surgery:* Two three-hour sessions per week, October 14, 1946, to May 31, 1947, inclusive. Fee $240.

D.P. 415A: Four three-hour sessions per week for fifteen weeks. Hours to be arranged. Fee $240.

D.P. 415B: Six three-hour sessions per week for ten weeks. Hours to be arranged. Fee $240.

D.P. 416: *General course in restorative dentistry:* Full time October 7, 1946, to February 3, 1947. Fee $480.

D.P. 416A: Full time, February 17, 1947, to June 2, 1947. Fee $480.

D.P. 417: *Orthodontics:* Four weeks, full time. Dates to be arranged. Fee $160.

D.P. 418: Three weeks, full time. Dates to be arranged. Fee $150.

D.P. 420: Full time, April 7-12, 1947, inclusive. Fee $75.

College of Dentistry, New York University, New York 10, Walter H. Wright, Dean; Leo Winter, Director, Postgraduate Division.

Postgraduate and refresher courses: Postgraduate and refresher courses will be offered during the academic year 1946-1947 as follows:

Ceramics: Sixteen three-hour sessions, Tuesday and Thursday mornings, beginning October 1, 1946.

Dentistry for children: Thirteen three-hour sessions, Monday, Wednesday and Friday afternoons, beginning October 2, 1946.

Fixed bridge construction: Twelve five-hour sessions, Friday afternoons, beginning October 4, 1946.

Inhalation anesthesia: Nine three-hour sessions, Friday mornings, beginning October 4, 1946.

Complete denture prosthesis: Twelve five-hour sessions, Friday afternoons, beginning January 1947.

Oral surgery: A one-year course, daily 9 a.m. to 4 p.m., beginning September 16, 1946. Enrollment has been completed in this course.

Periodontia: Three courses: Course A, three weeks full time, beginning April 1947; Course B, six months, Fridays all day and Thursday afternoons optional, beginning October 4, 1946; Course C, for specialists, six months, full time, beginning April 1947.

Pulp canal therapy: Twenty-four sessions, three three-hour sessions per week for eight weeks beginning October 1946.

Roentgenogram x-ray technic: Four two-hour sessions, Friday afternoons, beginning September 6, 1946.

Precision attachment bridge construction: Thirty-three three-hour sessions, Tuesday and Friday afternoons, beginning October 1, 1946.

Operative dentistry: Three-hour sessions Friday afternons, October 1946 to April 1947.

The attendance will be limited in all of these courses. An established postgraduate course in orthodontics is continued but is filled until 1948.

School of Dentistry, University of Buffalo, Buffalo, Russell W. Groh, Dean.

Postgraduate course: A postgraduate course in orthodontics will be offered in the academic year 1946-1947 beginning on October 1. The course will be conducted on full time for the year and will be limited to six students.

Ohio

College of Dentistry, Ohio State University, Columbus 10, Wendell D. Postle, Dean.

Graduate courses: Graduate courses leading to the degree of Master of Science in Dentistry are offered in cooperation with the Graduate School in orthodontics, oral surgery and anesthesia, periodontia, prosthetics and oral pathology and diagnosis.

Refresher courses: Through the aid of the W. K. Kellogg Foundation, three series of refresher courses will be offered during the academic year 1946-1947. First choice will be given to returned veterans who are graduates of Ohio State University and second choice to veterans from other colleges. Applications from civilian dentists will be considered but priority will be given to veterans. The charge for these courses will be $50 per week.

Autumn quarter, 1946: September 23-28, oral pathology; September 30-October 4, x-ray; October 7-11, removable partial dentures; October 14-18, crown and bridge prosthesis; October 21-25, full dentures; October 28-November 1, oral surgery; November 4-8, operative dentistry; November 18-22, children's dentistry; December 2-6, endodontia (root canal therapy).

Winter quarter, 1947: January 6-11, oral pathology; January 13-17, x-ray; January 20-24, crown and bridge prosthesis; January 27-31, removable partial dentures; February 3-7, full dentures; February 10-14, oral surgery; February 17-21, operative dentistry; February 24-28, endodontia; March 3-7, children's dentistry.

Spring quarter, 1947: March 31-April 5, oral pathology; April 7-11, x-ray; April 21-25, crown and bridge prosthesis; April 28-May 2, removable partial dentures; May 5-9, full dentures; May 12-16, oral surgery; May 19-23, operative dentistry; May 26-30, endodontia; June 2-6, children's dentistry.

School of Dentistry, Western Reserve University, Cleveland 6, William L. Wylie, Dean.

Refresher courses will be offered during the winter session. A definite schedule has not yet been set up.

Oregon

Dental School, University of Oregon, Portland 14, Harold J. Noyes, Dean.

No graduate, postgraduate or refresher courses are being offered at present. It is hoped that it may be possible by January 1, 1947, to make announcement of postgraduate and refresher courses.

Pennsylvania

School of Dentistry, Temple University, Philadelphia 30, Gerald D. Timmons, Dean.

Owing to the early transfer of the school to completely new quarters, no graduate, postgraduate or refresher courses will be undertaken during the academic year 1946-1947.

Thomas W. Evans Museum and Dental Institute School of Dentistry, University of Pennsylvania, Philadelphia 4, J. L. T. Appleton, Dean.

Graduate courses: Under the auspices of the Graduate School of Medicine, graduate courses are offered in oral surgery and anesthesia, oral medicine (including periodontia), prosthetics (including full and partial dentures, and crown and bridge work) and orthodontia.

Postgraduate and refresher courses: The tentative program of postgraduate and refresher courses for the academic year 1946-1947 is announced as follows:

Anesthesia, dental and oral surgery:

Course 1, daily, full time, December 16-21, 1946.

Course 2, daily, full time, June 2-7, 1947.

Ceramics:

Course 1, daily, mornings for two weeks, September 16-28, 1946.

Course 2, daily, mornings for two weeks, February 10-22, 1947.

Complete dentures:

Course 1, twice weekly, all day for three weeks, September 24-October 11.

Course 2, daily, all day, one week, January 6-11, 1947.

Course 3, once weekly, all day for fourteen weeks, February 13-April 30, 1947.

Course 4, twice weekly, all day for three weeks, April 22-May 9, 1947.

Endodontics:

Course 1, once weekly, all day Wednesdays for eleven weeks, October 2-November 27, 1946.

Course 2, daily, all day for two weeks, April 28-May 9, 1947.

Fixed bridge work:

Course 1, three times weekly, afternoons, for two weeks, November 11-22, 1946.

Course 2, three times weekly, afternoons, for two weeks, April 14-25, 1947.

Oral diagnosis and roentgenology:

Course 1, daily, all day for two weeks, January 6-18, 1947.

Course 2 (roentgenology), supervised practice. Time to be arranged.

Partial dentures:

Course 1, three times weekly, all day for two weeks, November 15-27, 1946.

Periodontics:

Course 1, daily, all day for one week, October 21-26, 1946.

Course 2, daily, all day for one week, November 4-9, 1946.

Course 3, once weekly, all day for six weeks, March 26 to April 30, 1947.

In addition to the above courses, it is planned to offer courses of from one to two weeks' duration in dentistry for children, public health and inlays. A general refresher course extending over a period of seventeen or thirty-four weeks is also contemplated.

School of Dentistry, University of Pittsburgh, Pittsburgh 13, H. Edmund Friesell, Dean.

Postgraduate and refresher courses: Postgraduate and refresher courses are being planned in oral surgery, anesthesia, operative dentistry, roentgenology and other subjects.

Tennessee

School of Dentistry, Meharry Medical College, Nashville 8, M. Don Clawson, President.

Refresher courses: Three refresher courses of one and two weeks' duration will be offered as follows: December 2-16, 1946, oral surgery; March 3-17, 1947, children's dentistry; June 3-17, 1947, crown and bridge prosthesis.

College of Dentistry, University of Tennessee, Memphis 3, R. D. Dean, Dean.

No graduate, postgraduate or refresher courses planned for 1946-1947.

Texas

College of Dentistry, Baylor University, Dallas 1, George L. Powers, Dean.

No graduate, postgraduate or refresher courses offered at the present time.

School of Dentistry, University of Texas, Houston 4, Frederick C. Elliott, Dean.

Plans for graduate, postgraduate and refresher courses have not yet been developed.

Virginia

School of Dentistry, Medical College of Virginia, Richmond, Harry Bear, Dean.

No graduate, postgraduate or refresher courses planned for 1946-1947.

Wisconsin

Dental School, Marquette University, Milwaukee 3, George W. Wilson, Dean.

General refresher courses: Separate classes will not be scheduled but veterans in limited numbers will be welcome to attend regular undergraduate lectures and laboratory periods

and to practice in the clinic. A registration fee of $25 will be charged. One full week of attendance is the minimum amount of time advised.

War Department

Professional graduate education for dental officers: In June of this year the War Department published a new Army Regulation, 350-1012, which provides a foundation for graduate dental education to members of the Army Dental Corps. The regulation will permit the Army to institute a training program in designated army general hospitals which parallels established residencies of the medical profession, and it also authorizes a limited amount of supplemental specialized training in civilian teaching institutions.

Army hospitals will again be available for dental internships to recent graduates and approximately twenty-five members of the current senior class will be commissioned as first lieutenant in the Reserve Corps upon graduation in June 1947 and placed on internship duty. Official announcement of the internships will be made by the Surgeon General in the near future.

It is hoped that such a program will elevate the general level of professional qualifications of all Dental Corps officers and develop an adequate number of qualified specialists in dentistry.

Navy Department

Postgraduate courses for dental officers: The following postgraduate courses for dental officers are scheduled to begin September 2, 1946, at the Naval Dental School, National Naval Medical Center, Bethesda, Md.:

Basic indoctrinational course: This course is designed for newly commissioned officers and is not as comprehensive professionally as the general postgraduate course. It gives special emphasis to naval customs, navy regulations, naval courts and boards and the Manual of the Medical Department.

General postgraduate course: This course is designed to acquaint experienced officers with recent advances and newly developed specialized procedures. It includes oral diagnosis and roentgenology, operative dentistry, periodontia, oral bacteriology, endodontia, biochemistry, crown and bridge prosthesis, partial and full denture prosthesis, exodontia, dental property and accounting and dental administration.

Specialized postgraduate courses: Oral surgery, prosthodontia, maxillofacial and ocular prosthesis, periodontia and oral pathology, operative dentistry.

All courses are of six months' duration.

Newly commissioned dental officers will be ordered to the basic indoctrinational course in such numbers as circumstances permit. Candidates for the general postgraduate and specialized postgraduate courses will be selected from dental officers who have submitted a request for postgraduate instruction in accordance with paragraph 1361, Manual of the Medical Department, 1945.

Caries in Monkeys and Apes.—In examining the skulls of apes, Colyer found the incidence of caries varying from 4.5 per cent in the chimpanzees to 0.7 per cent in gorillas. More than two hundred specimens of each genus were studied. In several species of wild monkeys he found that an average of 2.8 per cent had suffered from caries, while the skulls of captive monkeys showed that 8.3 per cent had been afflicted by caries. For no apparent reason the Old World monkeys were more susceptible to caries than the New World species. Also for no apparent reason, incisors were more generally affected in wild animals, molars in the captive specimens.—*Your Teeth: Their Past, Present and Probable Future. Peter J. Brekhus. Minneapolis: University of Minnesota Press, 1941.*

SHOULD DENTISTRY BE REPRESENTED IN THE WORLD HEALTH ORGANIZATION?

THE International Health Conference, at the conclusion of its four-day session, held in New York in June of this year, recommended the establishment of a World Health Organization under the auspices of the Economic and Social Council of the United Nations. The idea for convening this assembly originated with a declaration proposed jointly by the delegations of Brazil and China during the United Nations Conference in San Francisco in 1945. The declaration was unanimously approved by the United Nations.

The conference in New York was attended by representatives of fifty-one nations; thirteen governments were represented by observers. Participation in the conference by the United States was authorized by the Senate in December 1945 when it adopted a resolution requesting the President to take the necessary steps toward the formation of an international health organization. Delegates representing the United States were Frank G. Boudreau, director of the Milbank Memorial Fund; Edwin B. Fred, president of the University of Wisconsin; James E. Paullin, past president of the American Medical Association; Durward V. Sandifer, Department of State. Advisers to the United States delegates were selected from among the employees of the Department of State, the Public Health Service, the American Pharmaceutical Association, the American Medical Association, the Bureau of the Budget, the Federal Security Agency, the National Nursing Council and the Johns Hopkins School of Public Health and Hygiene.

The chief accomplishment of the International Health Conference was the adoption of a constitution for a World Health Organization and the appointment of an Interim Commission which was given authority to act until the constitution becomes effective.

Summary of the Constitution

The preamble of the constitution contains a statement of principles by which the World Health Organization will be guided in promoting health:

The states parties to this Constitution declare, in conformity with the Charter of the United Nations, that the following principles are basic to the happiness, harmonious relations and security of all peoples:

Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.

The enjoyment of the highest attainable standard of health is one of the fundamental rights of every human being without distinction of race, religion, political belief, economic or social condition.

The health of all peoples is fundamental to the attainment of peace and security and is dependent upon the fullest cooperation of individuals and states.

The achievement of any state in the promotion and protection of health is of value to all.

Unequal development in different countries in the promotion of health and control

of disease, especially communicable disease, is a common danger.

Healthy development of the child is of basic importance; the ability to live harmoniously in a changing total environment is essential to such development.

The extension to all peoples of the benefits of medical, psychological and related knowledge is essential to the fullest attainment of health.

Informed opinion and active cooperation on the part of the public are of the utmost importance in the improvement of the health of the people.

Governments have a responsibility for the health of their peoples which can be fulfilled only by the provision of adequate health and social measures.

Accepting these principles, and for the purpose of cooperation among themselves and with others to promote and protect the health of all peoples, the contracting parties agree to the present Constitution and hereby establish the World Health Organization as a specialized agency of the United Nations.

Objective and Functions

The objective of the World Health Organization will be the attainment by all peoples of the highest possible level of health.

In order to achieve its objective, the functions of the Organization shall be:

(a) To act as the directing and coordinating authority on international health work;

(b) To establish and maintain effective collaboration with the United Nations, specialized agencies, governmental health administrations, professional groups and such other organizations as may be deemed appropriate;

(c) To assist governments, upon request, in strengthening health services;

(d) To furnish appropriate technical assistance and, in emergencies, necessary aid upon the request or acceptance of governments;

(e) To provide or assist in providing, upon the request of the United Nations, health services and facilities to special groups, such as the peoples of trust territories;

(f) To establish and maintain such administrative and technical services as may be required, including epidemiological and statistical services;

(g) To stimulate and advance work to eradicate epidemic, endemic and other diseases;

(h) To promote, in cooperation with other specialized agencies where necessary, the prevention of accidental injuries;

(i) To promote, in cooperation with other specialized agencies where necessary, the improvement of nutrition, housing, sanitation, recreation, economic or working conditions and other aspects of environmental hygiene;

(j) To promote cooperation among scientific and professional groups which contribute to the advancement of health;

(k) To propose conventions, agreements and regulations, and make recommendations with respect to international health matters and to perform such duties as may be assigned thereby to the Organization and are consistent with its objective;

(l) To promote maternal and child health and welfare and to foster the ability to live harmoniously in a changing total environment;

(m) To foster activities in the field of mental health, especially those affecting the harmony of human relations;

(n) To promote and conduct research in the field of health;

(o) To promote improved standards of teaching and training in health, medical and related professions;

(p) To study and report on, in cooperation with other specialized agencies where necessary, administrative and social technics affecting public health and medical care from preventive and curative points of view, including hospital services and social security;

(q) To provide information, counsel and assistance in the field of health;

(r) To assist in developing an informed public opinion among all peoples on matters of health;

(s) To establish and revise as necessary international nomenclatures of diseases, of causes of death and of public health practices;

(t) To standardize diagnostic procedures as necessary;

(u) To develop, establish and promote international standards with respect to food,

biological, pharmaceutical and similar products;

(v) Generally to take all necessary action to attain the objective of the Organization.

World Health Assembly

The major portion of the Organization's work will be carried out, apparently, by a subdivision to be known as "The World Health Assembly." This body will be composed of three delegates from each member nation. However, member nations may send alternates and as many advisers as they may choose.

The World Health Assembly will meet in annual sessions and in special sessions as may be necessary. Its functions, among others (which are of special interest to the dental profession), will be:

(a) To establish such committees as may be considered necessary for the work of the Organization;

(b) To invite any organization, international or national, governmental or nongovernmental, which has responsibilities related to those of the Organization, to appoint representatives to participate, without right of vote, in its meetings or in those of the committees and conferences convened under its authority, on conditions prescribed by the Health Assembly; but in the case of national organizations, invitations shall be issued only with the consent of the government concerned;

(c) To promote and conduct research in the field of health by the personnel of the Organization, by the establishment of its own institutions or by cooperation with official or nonofficial institutions of any member with the consent of its government.

The Health Assembly will have authority to adopt regulations concerning:

(a) Sanitary and quarantine requirements and other procedures designed to prevent the international spread of disease;

(b) Nomenclatures with respect to diseases, causes of death and public health practices;

(c) Standards with respect to diagnostic procedures for international use;

(d) Standards with respect to the safety, purity and potency of biological, pharmaceutical and similar products moving in international commerce;

(e) Advertising and labeling of biological, pharmaceutical and similar products moving in international commerce.

Interim Commission

The constitution of the World Health Organization will come into force when twenty-six members of the United Nations agree to become parties to it. In the meantime there has been established an Interim Commission of the World Health Organization consisting of representatives from eighteen nations, one of whom will be from the United States. Each representative will be accompanied by an alternate and by advisers.

The Interim Commission has been assigned the responsibility of completing organizational details, of studying the question of relations with nongovernmental international and national organizations and of considering any urgent health problem which may be brought to its notice.

Dental Implications

In view of the fact that dentistry is an integral part of any general health service, it is logical to assume that many of the health problems with which the World Health Organization will be concerned will also encompass certain dental implications. This assumption can be applied specifically to the stated functions of the Organization dealing with: (1) the promotion of cooperation among scientific and professional groups which contribute to the advancement of health; (2) the promotion of maternal and child health and welfare; (3) the promotion of research in the field of health; (4) the promotion of improved standards of teaching and training in health, medical and related professions; (5) the study and report on, in cooperation with other specialized agencies, administrative and social technics affecting public health and medical care from preventive and curative points of view; and (6) the creation of an informed public opinion

among all peoples on matters concerning health.

Thus far there has been no indication of the intentions of the founders of the World Health Organization with respect to dental participation. Upon making inquiry, a member of the Council on Dental Health of the American Dental Association was informed by the secretary of the Interim Commission that matters of this nature would be considered during subsequent meetings of the Interim Commission and the World Health Assembly.

Speculation on the possibility of dental representation suggests three alternatives: (1) the appointment of a person to represent dentistry as one of the three United States delegates to the World Health Assembly; (2) the appointment of dental advisers to the various delegates; (3) the appointment of dental representatives as consultants to committees of the Health Assembly; or (4) the selection of national and international dental organizations to appoint representatives to participate, without right to vote, in meetings of the Health Assembly or its committees.

Conclusion

In recognition of the possibility that dentistry may not be adequately represented in the World Health Organization unless the dental profession takes the initiative in pointing out the advantages that would be made possible through dental representation, it is suggested that the House of Delegates of the American Dental Association take suitable action during its next annual session in Miami.

A resolution, setting forth the viewpoint of the dental profession and called to the attention of the United States delegation and the officials of the World Health Organization, would be a logical first step in the adoption of acceptable methods for promoting dental health as one of the functions of the World Health Organization.—*Allen O. Gruebbel, D.D.S., Executive Secretary.*

COMMITTEE ON HOSPITAL DENTAL SERVICE

BASIC STANDARDS OF HOSPITAL DENTAL SERVICE REQUIRED OF APPROVED HOSPITALS

The "Basic Standards of Hospital Dental Service Required of Approved Hospitals" has been approved as a recommendation for departments of dentistry in all hospitals by the Council on Professional Practice, the Coordinating Committee and the Board of Trustees of the American Hospital Association.

This plan was prepared and written by the Executive Committee of the Committee on Hospital Dental Service. Valuable suggestions and criticisms were submitted by other members of this committee, by members of dental departments in various hospitals, and by R. C. Buerki, chairman of the Council on Professional Practice of the American Hospital Association, and H. V. Hullerman, secretary.

Members of the Committee on Hospital Dental Service are as follows: W. Harry Archer, chairman, J. Frank Hall, secretary, Frank J. Houghton, Hamilton B. G. Robinson, Sam H. Brock, B. Lucien Brun, James O. Cameron, Malcolm W.

Carr, Reed O. Dingman, M. M. Fowler, Charles W. Freeman, Paul H. Hamilton, Daniel F. Lynch, Stephen P. Mallett, Sanford M. Moose, Douglas B. Parker, Col. Roy A. Stout, Sidney L. Tiblier, Carl W. Waldron and W. T. Wright.

I. General Considerations

Dentistry is an important health service. Since dental care is a necessary part of the treatment of many medical and surgical conditions for hospitalized patients, cooperation between medicine and dentistry is imperative in modern hospital organizations.

In addition to this coordination of dental service with other services, there are patients who are admitted primarily for the treatment of oral conditions, such as the repair of injuries about the jaws and surgical eradication of oral infections of dental origin. These patients should have the benefit of an efficient dental service.

Experiments with different plans of procedure and organization during the early stages of development have met with varying degrees of success. It is now evident that standardization is necessary.

II. Basic Requirements for the Department of Dentistry

1. *Hospital Department.*—The title of the department responsible for the hospital dental service should be "Department of Dentistry" or some similar title consistent with those used for divisions of services within the given hospital.

2. *Hospital Rules.*—The Department of Dentistry should be organized under the direction of a dentist to function as other specialties. The rules of the hospital should be amended, where appropriate, to include the word dentist. Any other revisions to encourage and permit proper functioning of the Department of Dentistry should be made. The rules of the Medical Board should be revised where necessary to accelerate interdependent procedures.

3. *Dental Staff.*

a. All dentists privileged to practice in the hospital should be organized as a definite group or staff. Membership upon the dental staff should be restricted to dentists who are:

(1) Graduates of schools approved or tentatively approved at the time of graduation, by the Council on Dental Education.

(2) Members of the American Dental Association or the National Dental Association.

(3) Worthy in character and in matters of professional ethics as set forth in the Code of Ethics of the American Dental Association.

When special work in oral surgery, periodontics, orthodontics or other specialties of dentistry is to be undertaken, the dentist should be qualified by training or experience.

b. Every dentist admitted to practice in the hospital should qualify for membership on the hospital staff in accordance with customary procedure. When accepted for appointment to the hospital staff, he should be assigned to the appropriate rank on the dental staff.

c. The number of appointments and grades in rank will depend on the size and type of the hospital. The classification of appointments according to rank will be dependent upon the standard nomenclature and custom in other departments of the given hospital. Promotion in rank should be consistent with the ability, interest and aptitude of the individual and the custom of the hospital.

d. Appointments: Dentists who are being considered for appointment to dental staffs should have qualifications such as previous hospital experience, technical ability and scientific training that would be expected of any other staff member. Opportunity should be afforded for acquiring experience under supervision of qualified staff members.

4. *Dental House Staff.*—Whenever possible, hospitals operating a Department of Dentistry should provide for dental interns and residents appointed according to the usual regulations of the hospital. Dental internships and residencies should conform to "Requirements for Approval of Dental Internships and Residencies," established by the Council on Dental Education of the American Dental Association, and should be consistent with internships and residencies in other departments of the hospital.

5. *Functions.*—The Department of Dentistry has three main functions:

a. Administrative: To act in an advisory capacity through customary channels on problems related to the dental services.

b. Clinical: To render professional service to the patients in accordance with the pre-

cepts of modern scientific dentistry, to maintain its own efficiency and periodically to audit the professional work.

c. Educational: To help train staff members, dental residents and interns, dental hygienists, dental assistants and nurses in order that their knowledge and field of usefulness may be increased.

6. *Organization.*

a. Direction: The dental department should be under the direction of a dentist designated by title as are other service chiefs. The chief of the dental department should be selected for his professional and executive ability on the same basis as other departmental chiefs. The chief of the Department of Dentistry should have the same privileges regarding appointment to the Medical Board or Executive Committee of the hospital as have other department chiefs.

b. Sections: In hospitals where large departmental staffs are required, the Department of Dentistry may be subdivided into sections:

(1) Oral Surgery
(2) Dental Roentgenology
(3) Restorative Dentistry (which includes operative and prosthetic dentistry)
(4) Dental Medicine (which includes periodontics and endodontics)
(5) Dentistry for Children (which includes pedodontics and orthodontics)

Division into sections fixes responsibilities more definitely, stimulates scientific interest in the dental specialties and promotes the proper administration of the professional services. Every department of dentistry should give special consideration to the differentiation of the dental staff into the various specialties in so far as such classification is practical. Establishing sections of the dental staff does not mean that every staff member should be a specialist in order to be assigned to a particular section.

c. Meetings and Seminars: The dental department personnel should attend and participate in general staff conferences. They should hold regular departmental meetings for thorough review and analysis of their clinical activities.

d. Education: Special effort should be directed toward adequate training of the interns and residents. Opportunity should be afforded for their training in general anesthesiology, physical diagnosis and other phases of the healing arts related and applicable to dentistry. Departmental ward rounds are essential to the educational plan and should be regularly scheduled. Opportunity should be provided for systematic specialized training of the dental department personnel. When facilities permit, the dental department should engage in the teaching of graduate students who desire to prepare themselves for the practice of one of the specialties of dentistry. The dental department should aid in nurses' training.

e. Research: Clinical investigations should be encouraged in the dental field. The hospital should make every effort to supply time, assistance and material for original investigations.

7. *Dental Hygienists.*—Whenever possible, dental hygienists should be appointed to the Department of Dentistry.

8. *Physical Equipment.*—The space allotted to the Department of Dentistry and the equipment, instruments and supplies of the department should be adequate for such services as may be carried out by the dental department in accordance with generally accepted standards of practice. The physical equipment should be utilized full time and the dental personnel should be adequate to maintain this standard.

An adequate number of beds should be assigned to the dental department in hospitals where such procedure is customary for other departments.

9. *Rules.*—The Department of Dentistry should function with a systematic plan of management based upon rules set up by the hospital for other services within the hospital.

10. *Records.*—Dental records should be a part of the hospital record system. A uniform method should be established for recording data. Special clinical records may be used as an aid to clinical research.

11. *Library.*—An adequate selection of dental books and periodicals should be available in the hospital library.

12. *Formulary.*—A standardized departmental formulary, based upon Accepted Dental Remedies of the American Dental Association, should be adopted and included in the general formulary of the hospital.

III. Minimum Dental Service for Hospital Patients

The hospitals should rapidly evolve a Department of Dentistry with adequate facilities

to assume the responsibilities for a more complete dental service for patients on the wards and in the outpatient clinic. In order to extend dental care in that direction as rapidly as economic and manpower resources will permit, the following general plan is suggested:

The extent of the dental service provided by the Department of Dentistry will vary in accordance with (a) the size of the hospital, (b) the type of the hospital and (c) the type of service rendered by the hospital. For example, in hospitals for persons with tuberculosis, for persons with mental diseases, and for crippled children, a more complete dental service is necessary.

It is recognized that an ideal program would include a complete oral examination including a complete dental roentgenographic interpretation as a routine for hospitalized patients. Outpatients should be afforded the same service when facilities permit. However, with the present limitations of personnel and general development of dental departments, it would seem desirable to postpone such a requirement as a minimum standard. Vitality tests, transilluminations, and bacteriologic, pathologic and other laboratory tests should be used where indicated. Dental consultation should be made available by the Department of Dentistry to the several other departments in the hospital.

The oral conditions should be recorded on a special form with appropriate recommendations for treatment. This form should become a part of the official hospital record of the patient.

A careful study of fundamental problems forces the conclusion that, in order to set up minimum standards for a Department of Dentistry under hospital auspices, the sections listed below should be responsible for the services as follows:

1. *Oral Surgery.*—The work of the section of oral surgery in relation to the hospital outpatients and inpatients lies in diagnosis and surgical treatment. Treatment should consist of surgical eradication of acute and chronic oral infections. Experience in many hospitals has indicated that it is both feasible and desirable for the patients' welfare that the oral surgical service should care for diseases and injuries of the teeth and jaws amenable to oral surgery.

Transfer or assignment of such services to the section on oral surgery to care for those conditions is required and will, of course, be with the consent of the Medical Board.

2. *Dental Roentgenology.*—The members of this section will, if they do not take the dental roentgenograms, at least be the consultants to the roentgenographic department for cooperative diagnosis of all dental roentgenograms.

3. *Restorative Dentistry.*—In certain types of hospitals, especially those serving patients suffering from chronic diseases, such as tuberculosis and mental diseases, restorative dentistry is a necessary service.

Carious lesions of the teeth should be treated in the early stages by properly preparing the teeth and by using an appropriate type of filling material to restore the teeth to usefulness and to prevent pain and infection from this source.

Complete and partial artificial denture service should be available for patients with extended hospitalization.

This department should be responsible for the construction of splints for fractured jaw cases and for radium therapy in malignant cases.

4. *Dental Medicine.*—Patients with acute and chronic infections of the investing soft tissues of the teeth are to be treated by, or under the direction of, the periodontist. In instances where oral lesions are primarily of systemic origin, the dental department should work in cooperation with the appropriate medical department.

5. *Dentistry for Children.*—In certain types of hospitals where children are hospitalized for an extended period of time, that is, those serving crippled children and children with chronic diseases, the practice of pedodontics and orthodontics is a necessary service.

Orthodontic service should be available to children's hospitals for consultation and treatment. Cleft palate cases especially need this service.

IV. Relation to the School of Nursing

The Department of Dentistry should assist existing schools of nursing to prepare all nurses for participation in the oral health care program. When allocation of the clinical content of the nursing educational program is made to the different clinical departments, those conditions related to dental service should be allotted to the dental department. The chief of the Department of Dentistry with

the educational director of nursing should assign the material to be taught by the appropriate members of his department. The role of the nurse in health teaching and in prevention of disease, as they relate to dentistry, should be defined by the dental and nursing departments.

Student nurses should be assigned to care for patients on the dental service of the hospital, and to assist in the dental clinic on the same basis as in other departments.

Application for Approval

A certificate of approval for a Department of Dentistry in a hospital is granted by the Committee on Hospital Dental Service of the American Dental Association to those hospitals meeting these standards.

Application blanks may be obtained by writing to the secretary of the Committee, J. Frank Hall, D.D.S., Indiana University, School of Dentistry, Indianapolis 2.

The hospital will then be visited by a member of the Committee or one of its consultants to confer with the hospital staff.—*W. Harry Archer, Chairman; J. Frank Hall, Secretary; Frank J. Houghton; and H. B. G. Robinson, Executive Committee.*

MEMBERSHIP COMMITTEE

FORTY STATES VIEW MEMBERSHIP COMMITTEE FILM, "THE STORY OF THE AMERICAN DENTAL ASSOCIATION"

More than forty states have held showings of the film, "The Story of the American Dental Association," according to figures compiled as of June 30 by the Membership Committee. Additional showings were held by various groups in Panama, the District of Columbia, the Army and the Navy. Since its release, the picture has been given more than two hundred showings before dental, educational and civic groups. In Texas, the film was made an official part of the program in all of the district dental societies.

The film has been found to be particularly useful by many dental schools, which employ it as an integral part of their orientation courses. Many showings have also been given the film by Rotary, Kiwanis and other civic clubs, usually as a part of a program arranged by dental members.

Copies of "The Story of the American Dental Association" are available for 16 mm. sound machines. There is no charge other than that for transportation. In order to avoid disappointment, program committees are asked to make early requests for the film so that shipping arrangements can be made. Requests should be sent directly to the Office of the Business Manager, American Dental Association, 222 East Superior St., Chicago 11.

BUREAU OF PUBLIC RELATIONS

NEW RADIO SERIES FOR CHILDREN DISTRIBUTED FREE TO LOCAL SOCIETIES AND SCHOOLS

A SECOND series of thirteen electrical recordings of programs for children especially prepared for radio broadcast and classroom use is being produced for free distribution to local societies, schools and libraries by the Bureau of Public Relations.

The new series, to be known as "West of the Wind," follows the same general pattern as an earlier series, "Tales from Ivory Towers."

Each transcription consists of a dramatized episode from well-known children's stories. Inserted in each are two short dental health messages. The earlier series has been highly praised by educators for its unique combination of excellent literature with sound dental health information.

The new recordings were written and produced by professionals under the over-all direction of the Bureau of Public Relations. Mrs. Ruth Harshaw, well-known radio educator and writer, planned and wrote the scripts. The storyteller, Harry Elders, is a Chicago radio actor. Albert R. Crews, the director, formerly was the head of the radio department of Northwestern University and is now associated with the National Broadcasting Company. The announcer, Lee Bennett, is on the staff of radio station WGN in Chicago.

Although "West of the Wind" is primarily for children 7 to 11 years of age, the productions are of interest to all age groups.

Unlike the earlier series which sold for $3 a record and $25 for the complete set, the new recordings will be loaned without charge to all state and component societies for radio programs over local stations and to schools and libraries for special presentations. A set of the recordings can be obtained by writing the Bureau of Public Relations, American Dental Association, 222 East Superior St., Chicago 11.

NEW SERVICE PROVIDES DENTAL HEALTH INFORMATION FOR INDUSTRIAL AND OFFICE WORKERS

A NEW dental health information clipsheet service for editors of industrial and office publications has been inaugurated by the Bureau of Public Relations.

At intervals of two months, editors of house organs and trade publications will receive clipsheets containing cartoons and short news items designed to remind the millions of American factory

and office workers of the importance of protecting their dental health.

The first of the news releases featured a cartoon emphasizing the importance of teeth in personal appearance. In addition, there were twelve brief news items on the importance of early dental care for children, loss of time through dental infections, distribution of dentists, suggestions for a homemade dentifrice and other data.

This first release was distributed to editors of more than 5,700 house organs and trade publications. Subsequent distributions will be made in response to direct requests from these editors.

The new service was designed at the request of dental and medical officers of several large corporations with several hundred thousand employees. A limited number of the first clipsheet in the new series is still available. Members can obtain a copy by writing the Bureau of Public Relations.

PRINT REVISED EDITION OF "TEETH, HEALTH AND APPEARANCE"

A COMPLETELY-REVISED edition of "Teeth, Health and Appearance," one of the most popular of recent educational books published by the American Dental Association, will soon be available for distribution to members and the general public.

Copy for the new edition has been written by Lon W. Morrey, director of the Bureau of Public Relations, with the assistance of the Public Relations Committee of the American Dental Association.

As revised, "Teeth, Health and Appearance" will contain 100 illustrations, 50 in color. It is written simply and factually so that the subject matter can be understood by the high school child and the average adult.

Although all copy has been forwarded to the printer, paper and labor shortages may delay final publication until December. Orders for the new edition are now being accepted by the Bureau of Public Relations. Individual copies will sell for $3.

DENTAL NEGLECT HIT IN CARTOON SENT TO 3,000 NEWSPAPERS

SUPPLEMENTING regular news releases to the nation's press, a new cartoon entitled, "Figure It Out for Yourself," has been distributed in mat form to 3,000 newspapers by the Bureau of Public Relations.

The cartoon is in the form of an illustrated equation showing the pain, loss of time and additional cost to each person who neglects his dental health. The final panel points out that each person can save time and money and avoid pain by regular dental examinations.

Use of cartoons and drawings has proved to be highly effective in carrying dental health information to the millions of newspaper and magazine readers of the nation.

COUNCIL ON DENTAL THERAPEUTICS

COUNCIL ON DENTAL THERAPEUTICS LISTS PRODUCTS FOR "ACCEPTED DENTAL REMEDIES"

THE Council on Dental Therapeutics of the American Dental Association announces the inclusion of the following products in the list of Accepted Dental Remedies:

Dentifrices[1]

Hartz Tooth Paste: Composition: Each hundred grams is stated to contain precipitated calcium carbonate (Snow Top Medium), 42.02 gm.; soap powder, 6.5 gm.; heavy white mineral oil, 1.18 gm.; potato starch, 3.5 gm.; tragacanth powder, 0.25 gm.; glycerin, 23.08 gm.; saccharin, 0.25 gm.; methyl salicylate, 1.5 gm.; eucalyptol, 0.344 gm.; oil peppermint, 0.25 gm.; carmine color, 0.25 gm.; thymol, 0.028 gm.; and water, 20.86 gm. Manufactured and distributed by the J. F. Hartz Co., Detroit.

Antiseptics and Antibiotics[2]

Zephiran Chloride Solution 1:1,000: Zephiran chloride, 0.1 per cent; water, 99.9 per cent.

Zephiran Chloride Stainless Tincture 1:1,000: Zephiran chloride, 0.1 per cent; alcohol, 50 per cent; acetone, 10 per cent; water, 39.9 per cent.

Zephiran Chloride Tinted Tincture 1:1,000: Zephiran chloride, 0.1 per cent; alcohol, 50 per cent; acetone, 10 per cent; color and water, 39.9 per cent.

Zephiran Chloride Aqueous Solution 12.8%: Zephiran chloride, 12.8 per cent; water, 87.2 per cent. (This is a concentrated dosage form, intended for dilution with distilled water or other suitable solvent or mixture to produce the other accepted dosage forms of zephiran chloride. It is the most economical form in which to buy zephiran chloride if large quantities are to be used.) Distributed by Winthrop Chemical Co., Inc., New York.

Penicillin Troches, Abbott.—Each troche is stated to contain tragacanth, powder, 42.6 mg.; acacia, powder, 42.6 mg.; sodium carboxymethylcellulose, 19.0 mg.; sugar, powder, 745 mg.; penicillin calcium, 1,000 units; flavor (creme de menthe), 0.66 mg.; magnesium stearate, 2.56 mg.

Indications: Penicillin Troches are indicated as an adjunct in acute ulceromembranous gingivitis (Vincent's infection). They are contraindicated in cases demonstrating local sensitivity to the drug.

Local Effects, Systemic Toxicity and Actions: See "Penicillin," A.D.R., Ed. 12, p. 103.

Dosage: The dosage for Penicillin Troches according to Keefer *et al.* is as follows: Allow one troche to dissolve in the mouth. Repeat two or three times a day between meals.

Penicillin Troches should be allowed to dissolve in the mouth as slowly as possible. This may be accomplished by placing them one at a time in the space between the cheek and the molar teeth, where they should be left undisturbed by the tongue.

In view of the fact that treatment of Vincent's infection with troches is in a

1. A.D.R., Ed. 12, p. 156.
2. A.D.R., Ed. 12, p. 72.

somewhat experimental stage, a more intensive dosage might be desired. The most effective action will probably be obtained by keeping a troche in the mouth constantly during the waking hours, and placing one *in situ* just before going to sleep. The patient should be instructed that, if he awakens at night, he should place a fresh troche in his mouth before he goes to sleep.

Penicillin Troches, Abbott, in bottles of 24: Manufactured by Abbott Laboratories, North Chicago, Ill.

Anesthetics—Local[3]

Procaine HCl 2%, Epinephrine 1:25,000: Each cubic centimeter is stated to contain procaine HCl, 0.02 gm.; epinephrine, 0.00004 gm.; sodium bisulfite, 0.0019 gm.; sodium chloride, 0.0028 gm.; chlorobutanol, 0.005 gm.; and distilled water.

3. A.D.R., Ed. 12, p. 48.

Procaine HCl 2%, Epinephrine 1:50,000: Each cubic centimeter is stated to contain procaine HCl, 0.02 gm.; epinephrine, 0.00002 gm.; sodium bisulfite, 0.0019 gm.; sodium chloride, 0.0028 gm.; chlorobutanol, 0.005 gm.; and distilled water. Marketed in tubes, 2.25 cc. Manufactured by Entisol Laboratories, New York.

Admission of a product to the list of Accepted Dental Remedies means that the product and the methods by which it was marketed at the time of consideration were not found to be in violation of the Council's published rules. Accepted products are reconsidered periodically. The files of the Council contain information on many drugs and dental cosmetics which is available upon request, and inquiries are welcomed.—*Donald A. Wallace, Secretary.*

FIRM AGREES TO CEASE REPRESENTING THAT KONTROL TOOTH PASTE AFFORDS "AUTOMATIC BREATH CONTROL"

MARK W. ALLEN and William A. Boyd, copartners trading as Mark Allen Co., 109 Second Ave., Detroit, entered into a stipulation with the Federal Trade Commission to cease and desist from advertising that Kontrol Tooth Paste affords "automatic breath control" or otherwise misrepresenting its properties.

The stipulation also was signed by W. K. Holmes, trading as Holmes Associates, 6432 Cass Ave., Detroit, advertising agent for the partnership.

The respondents agree to cease representing that the product will control the breath or stop bad breath; that it is a scientific breath control paste and gives automatic breath control; that it will have any effect on the breath other than temporarily imparting its odor thereto; that it is two products in one; that it contains a concentrated mouth wash; or that it contains no abrasives.

Stipulation 03317, July 30, 1946 (from Federal Trade Commission Releases).

COMMITTEE ON LEGISLATION

STATE BOARD HAS INHERENT POWER TO REVOKE A LICENSE

A STATE board has an inherent power to revoke a license that was obtained by fraud or misrepresentation, even though the power to revoke a license for this reason is not set forth in the statute, according to a recent decision of the Supreme Court of the state of Pennsylvania. The case involved a physician who was licensed to practice medicine and surgery in the state of Pennsylvania in 1910. In 1944 the state board started to hold a hearing to determine whether his license to practice medicine and surgery had been obtained through fraud, misrepresentation and deception.

The physician went into court to prevent the hearing and claimed that the hearing would be illegal for the reason that the state board had no authority under the Pennsylvania law to revoke a license on the grounds of fraud or misrepresentation because these grounds were not specifically mentioned in the statute.

The Pennsylvania Supreme Court, in a decision dated June 26, 1946, held that the general rule is that, where the license should never have been granted for reasons such as fraud or forgery, the licensing authority has an inherent power to revoke it and that the power of the state to require a license implies the power to revoke a license which has been improperly issued.

The court further said that the mere fact that the physician was once issued a license and practiced under it does not give him a vested right in his license which will prevent the board of examiners from thereafter revoking it for cause (Schireson v. Shafer, 47A. 2d. 665).—*George H. Fox, Secretary.*

ANALYSIS OF THE NATIONAL HEALTH ACT OF 1946, S. 2143

THE National Health Act of 1946, S. 2143, was introduced into the Senate of the United States by Senators Taft of Ohio, Smith of New Jersey and Ball of Minnesota.

The bill proposes to furnish health, hospital and medical services to families and individuals with low incomes; to give a free dental examination to all school children regardless of ability to pay; and to furnish dental care and treatment to school children, families and individuals with low incomes.

Dental Benefits

S. 2143 proposes to provide dental

services for school children and for families and individuals with low incomes and authorizes an appropriation each year for this purpose starting with the sum of $8,000,000 for the year 1947 and increasing the amount $4,000,000 each year until $20,000,000 will be reached in 1951.

Any state wishing to share in the federal funds must create a state dental advisory council, which must include representatives of the state dental association along with representatives of state agencies and of nongovernmental organizations. The state shall design a state-wide program calculated within five years to provide for the annual inspection of the teeth of all children in the elementary and secondary grades of the public and private schools in the state, and to provide for the care and treatment, including prophylaxis, filling, roentgenography, extraction and related care, other than straightening, of the teeth of those children in the elementary and secondary schools of the state whose family or guardian have insufficient income to pay for the whole cost of such services, as certified to the state agency by the principal or other head of the school at which the child is in attendance. A state plan *may at the option of the state* provide dental care for those persons having insufficient income to pay the cost of such service. The plan shall provide for the collection of proper charges of less than the total cost of services rendered to those unable to pay in whole, but able to pay in part therefor. Each state plan shall be based on a state-wide inventory of existing dental care and inspection, including that provided by the state and its subdivisions and by private organizations, and shall describe in detail the plans of the state for the extension of such services. The bill further requires that dental inspection and dental care and treatment shall be furnished to all persons unable to pay in full therefor, without discrimination on account of race, creed or color.

Each state is required to make a complete report to the Surgeon General at the end of each year. If the Surgeon General finds that the state agency is not complying substantially with the state plan, that the federal funds have been diverted from the purposes for which they were allotted or that the state has failed to pay at least twice as much money as received from the federal government, then the Surgeon General may stop further payments to the state. The provision is made that in such cases the state may appeal to the United States courts.

The bill creates a "National Dental Health Council" to consist of the Surgeon General (U. S. Public Health Service), as chairman, the Assistant Surgeon General (dental) ex-officio, and five members, appointed by the Federal Security Administrator, who are outstanding in fields pertaining to dental health and at least three of whom must be dentists. Their terms are to be for three years each. The council may appoint special advisory and technical committees; and members of the council and of such special committees are to receive up to $25 a day plus their traveling and subsistence expenses. In administering the dental health programs, the Surgeon General is required to consult with the National Dental Health Council. The Surgeon General may call a conference of representatives of the appropriate state agencies at any time regarding dental programs.

The bill further requires that a state plan shall be administered on a civil service basis, with the provision that the Surgeon General of the United States shall have no authority with respect to the selection, tenure of office or compensation of any person employed under the state plan. The bill also requires that the state agency make certain reports and that it review its plan from time to time.

The Surgeon General is required to

approve any state plan which meets the requirements set forth in the law. If he disapproves a state plan, the state agency may apply to the National Dental Health Council for a hearing and, if the council finds in favor of the state agency, the Surgeon General must approve the state plan. No state plan may be disapproved because the Surgeon General disapproves of the methods proposed in the plan, if the state plan is designed and calculated by the end of the five-year period to provide dental inspection for all school children at a cost within the probable financial resources of the state with federal aid. It is intended that the states shall devise in each case the methods by which this end is to be attained.

The amount of federal aid to which a state shall be entitled is to be determined by a mathematical formula which takes into consideration the ratio of the income of the state in proportion to the income of the continental United States, with the provision that the state must pay at least two-thirds of the cost of the dental program within that state.

Dental Research

The bill provides that the National Institute of Dental Research shall be a division of the National Institute of Health. The Surgeon General working through the National Institute of Dental Research and in cooperation with the National Dental Health Council is authorized to conduct research studies relating to the cause, treatment, control and prevention of dental diseases, to make grants-in-aid to public and private agencies for dental research and to provide fellowships in the National Institute of Dental Research and other institutions.

The National Dental Health Council is authorized to initiate research projects and to review applications for federal funds for research projects.

For the fiscal year ending June 30, 1947, an appropriation is authorized for grants-in-aid for dental research and training not to exceed $75,000, and for research and scholarships within the National Institute of Dental Research not to exceed $175,000; for the fiscal year ending June 30, 1948, for grants-in-aid for dental research and scholarships not to exceed $150,000, and for research and scholarships within the National Institute of Dental Research not to exceed $250,000; and for subsequent fiscal years for grants-in-aid for dental research and scholarships not to exceed $300,000, and for dental research and scholarships within the National Institute of Dental Research not to exceed $300,000. An appropriation of $1,000,000 is authorized for the erection and equipment of a suitable building for the National Institute of Dental Research to be located in or near the District of Columbia.

National Health Agency

The bill proposes to create, in the executive branch of the government, an independent agency to be known as the "National Health Agency." This agency shall be administered by a "National Health Administrator," appointed by the President with the advice and consent of the Senate, and he is to receive a salary of $15,000 a year. The Administrator shall engage in no other business, vocation or employment; and he must be a doctor of medicine, with either eight years' experience in the U. S. Public Health Service, or five years of active practice and three years' experience in medical research, teaching or administration. All activities of the federal government relating to health are to be centralized in this agency.

The agency is to be responsible for governmental activities concerned with (1) the administration of funds appropriated as grants to states for medical care, dental care, hospital facilities and all other health activities; (2) the prevention of disease through water purification, sewage treatment and the elimina-

tion of lake and stream pollution, and the promotion of research toward this end; (3) the promotion of maternal, prenatal and child care, and the study and dissemination of information on child growth, development and nutrition; (4) the protection of the national health by promoting purity, standard potency and truthful and informative labeling of foods, drugs and cosmetics; (5) the training and rehabilitation of persons vocationally handicapped because of permanent disability; and (6) such related matters as shall aid the states and the people of the United States in the maintenance of adequate and efficient health facilities and otherwise promote the national health.

The bill would transfer to the agency: the Public Health Service; Saint Elizabeth's Hospital; the Food and Drug Administration; the Office of Vocational Rehabilitation; the functions and duties of the Children's Bureau in the Department of Labor, except those relating to child labor under the Fair Labor Standards Act; and the functions and duties of the Division of Health Studies in the Bureau of Research and Statistics of the Social Security Board. The agency is to have no jurisdiction over any of the powers, functions or duties exercised by the Army, Navy or Veterans Administration.

Medical Service Benefits

In order to furnish medical service for families and individuals with low incomes, the bill authorizes an appropriation each year for the next five years of $200,000,000 to be used for making payments to the states. Any state entering the program shall provide for the designation of a state health advisory council, which shall include representatives of nongovernment organizations and of state agencies concerned with health, hospital or medical services, including representatives of state medical associations, voluntary nonprofit and hospital associations or other groups interested in health and medical services; and shall set forth a state-wide program designed to provide within five years (a) hospital, surgical and medical services for all those families and individuals in the state having insufficient income to pay the whole cost of such services, and (b) health inspection services for all children in elementary or secondary schools in the state. This plan *may, at the option of the state,* provide medical services in the home or physician's office for such families and individuals. The plan *may* also provide for the furnishing of such services to such families and individuals by means of payments of premiums or partial premiums by the states, in behalf of those families and individuals unable to pay the whole cost of such insurance, to any voluntary health, medical or hospital insurance fund operated not for profit. The plan shall provide for the collection of proper charges of less than the total cost of such services from persons unable to pay in whole, but able to pay in part. The plan *may* include annual payments to physicians practicing in areas which, without such payments, would be unable to provide sufficient income to attract a practicing physician. The plan shall be based on a state-wide inventory of existing medical, surgical and hospital care, including that provided by the state and by private organizations, and shall describe in detail the extension of such services to the end that such services be furnished without discrimination on account of race, creed or color to all persons unable to pay in full therefor. The financial participation by the state shall be at least twice as much as the federal aid received by the state. The state plan shall provide for the administration of personnel standards on a civil service basis, though the Surgeon General is to have no authority with respect to the selection, tenure of office or compensation of any person employed under the state plan. The state agency administer-

ing the plan shall make such reports as the Surgeon General shall require and shall review the state plan whenever necessary.

Neuropsychiatric Research

The bill also creates a "National Institute of Neuropsychiatric Research" to operate as a division within the National Institute of Health. A National Advisory Council on Mental Research is created to conduct a research study relating to neuropsychiatric diseases and disorders, to make grants-in-aid for such research and to provide for scholarships in the National Institute of Neuropsychiatric Research. A sum not to exceed $4,500,000 for the erection and equipment of a suitable hospital and laboratory and for other facilities for the use of the National Institute of Neuropsychiatric Research is authorized to be appropriated.—*George H. Fox, Secretary.*

COMMENT ON TESTIMONY OF AMERICAN DENTAL ASSOCIATION ON WAGNER-MURRAY-DINGELL BILL

THE United Public Health League, a federation of seven western state medical societies, in a recent news letter, made the following comment concerning the testimony of the American Dental Association on the Wagner-Murray-Dingell bill:

Dr. Carl O. Flagstad, Professor of Prosthetic Dentistry at the University of Minnesota and Chairman of the American Dental Association Legislative Committee, was a very able and positive witness, who showed a complete knowledge of the bill. Dr. Flagstad pointed out that two bills already before Congress (S. 190 and S. 1099) would do more for dental health than S. 1606. These bills would provide federal grants-in-aid to the states for intensified research and an experimental program in all phases of dental health, education and care. He also pointed to the fact that there are not enough dentists in the country to provide complete dental care and that S. 1606 provides only a type of preventive care which is below the quality that Americans now receive. S. 1606, he found, is not good legislation.

The United Public Health League is a federation of the medical societies in Arizona, California, Colorado, Montana, Nevada, Idaho and Utah. It was formed in 1944 to carry news to congressmen, senators and government officials on the public health aspects of proposed legislation and on the attitude of the physicians toward such legislation. It also sends to members of the League news from Washington affecting the public health and the practice of medicine.

CASES AND COMMENTS

"Salesmanship in Dentistry"

To the Editor: In my paper, "Salesmanship in Dentistry Through Patient Education," published in THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION 31:41, January 1944, I note that there is a similarity of some passages to portions of a copyright article, "A National Plan of Re-Education for Control of Dental Diseases Through Prevention" by David Friend, New York.

In justice to Mr. Friend, it is understood that I was undoubtedly influenced and impressed by his article. Though there is similarity of material and ideas, its use by me was entirely unintentional as to infringement of copyright. I desire that Mr. Friend be given full credit for the ideas and material.

Very truly yours,
E. R. Swank, D.D.S.
Des Moines, Iowa

Laboratory Procedures in Restoring Mastication, Vertical Dimension and Esthetics.

By Markus Ring, Major (MAC); Designing Officer, Central Dental Laboratory, Fort McPherson, Ga.

Among the thousands of dentures constructed at the Central Dental Laboratory, Fort McPherson, Ga., few have presented such extreme conditions and multiple objectives as those involved in the case presented herewith.

Study casts, bites, photographs and complete data were furnished this laboratory by the station dental surgeon of the Nashville Municipal Airport. The history of the patient, a soldier stationed at Nashville, revealed that he had lost about fifteen pounds of weight during foreign ferrying missions extending over approximately one month. Teeth previously lost were the upper lateral incisors, the right first bicuspid and left bicuspids; and in the lower jaw, the right second bicuspid and first molar and the left first bicuspid. Further history disclosed the remaining teeth to be non-carious, the tissues normal and a condition of excessive closure of the mandible to be present, resulting in severe Class 3 malocclusion. The patient stated that his teeth had varied little, if any, since childhood, and that he wanted his condition corrected (Fig. 1) with dentures rather than by surgery.

Of greatest importance was the bite rim (Fig. 2) giving the vertical opening and labial fullness which could be easily tolerated, and from which position the mandible could still be opened in a normal arc. Articulated, with the bite open (Fig. 3, left), the

Fig. 1.—Note fold of upper lip owing to excessive closure of the mandible. With little effort the patient could make contact between his nose and lower lip

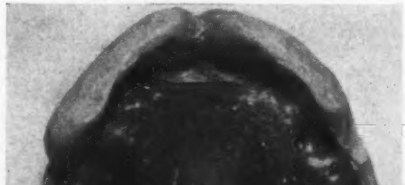


Fig. 2.—Thickness of wax in the left bicuspid area exceeds 5 mm.

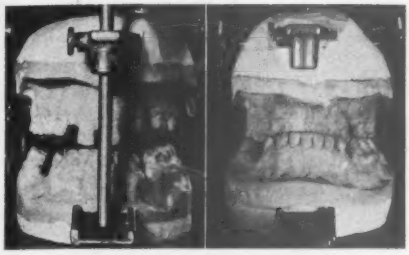


Fig. 3.—Left: Although the models appear to be considerably opened, the laboratory was advised that the patient could tolerate a slight additional opening if necessary. Right: The study models articulated

models showed the arches to be out of occlusion 2 mm. at the incisors and 6 mm. at the first molars, which allowed a template to be inserted freely. This template rested on the lower central incisors and was raised at the first molar area halfway between the arches showing the new possible plane of occlusion.

An individual study of each cast was then made on a surveyor to determine the amount and nature of mouth preparation required (Fig. 3, right). Adequate undercut areas and a favorable path of insertion were found on the lower cast with the model horizontal, and a tentative design was sketched on the model.

The upper model was tilted posteriorly until the mesial surfaces of the right second bicuspid and left first molar were parallel with the vertical spindle or mandrel of the surveyor. In this position, the tissue undercut of the labial fold was all but eliminated and excellent retentive areas were created on the distal surfaces of every posterior tooth. Because undercuts on the labio-distal surfaces of both cuspids became excessive owing to their normal buccal tilt, extraction of both teeth was recommended. An unusual undercut area was created on the distal surface of the right central incisor which could be well utilized for anterior support. Inasmuch as the palatal surface was to be completely open, it was decided to use a Roach type mesiodistal grip clasp with the body or rigid portion on the mesial and labial surfaces, and with the free arm emerging from the acrylic resin and engaging the distal undercut (Fig. 4). A slight alteration on this tooth was deemed advisable, however, and the dental officer was requested to reduce the undercut by grinding the incisal third of the distal surface. Conventional buccal arms on the four upper molars, reciprocated by lingual extensions of the cast occlusal pads, completed the survey, and the study models were returned with our recommendations. These corrections were accomplished exactly as requested together with a thorough prophylaxis and re-check of all fillings, and accurate stone casts were forwarded to this laboratory for construction of the dentures.

The master models were indexed and mounted on the articulator for an exhaustive study to re-check previous decisions and complete all details. The vertical opening and labial flange had been precisely determined by the bite rim and the previously proposed plane of occlusion re-checked and accepted. Consideration was then directed toward a possible closing of the bite caused by normal wear of the acrylic resin which was to be placed over gold, thus forming the posterior occlusal pads. To overcome this possibility, it was decided to cast a portion of the occlusal surfaces of the posterior pads to resemble an inlay in the finished denture (Fig. 5) so that each would occlude with another so-called inlay or a porcelain tooth.

Lack of space for the pins dictated the use of acrylic teeth for the four upper incisors but edentulous areas were available for por-

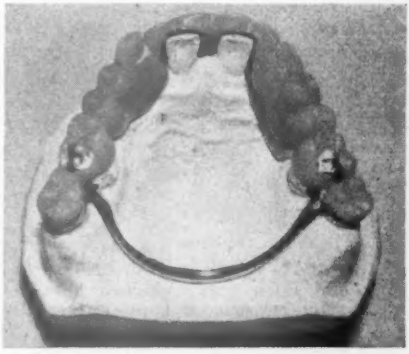


Fig. 4.—The free arm of the mesiodistal clasp can be seen on the distal surface of the right central incisor

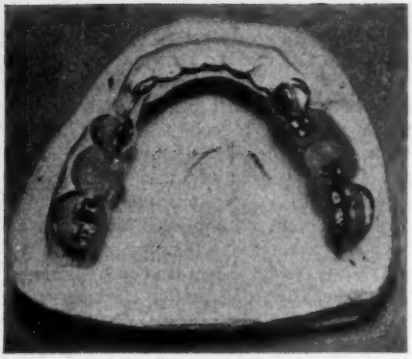


Fig. 5.—The so-called inlays added to acrylic surfaces to prevent their subsequent wear

celain cuspids, first bicuspids and left second bicuspid. Sufficient room was expected in which to place a short mold of porcelain over the natural right second bicuspid although the decision was reserved until the final setup.

In sketching the outline of the upper denture on the master model, a gold finish line was designed entirely around the lingual border of the acrylic resin except on the distal surface of the right central incisor where it was omitted to allow the free clasp arm to function. The finish line thus became a rest by covering the incisal edges of both central incisors. Immediately it became apparent that this gold could possibly be seen with the mouth open, thereby detracting from esthetic value which was a prime factor. It was therefore decided to set the lateral and cuspid teeth edge to edge and the central teeth in prognathous relation 1 mm. below the incisal edge of the lower central teeth to prevent positively the display of gold in an anomalous area (Fig. 6).

Obviously, by making the dentures separately, the task of creating a near perfect plane of occlusion would be greatly simplified. Therefore the lower model was removed and mounted for final surveying. After examination of undercuts in a complete variety of tilted positions, the most favorable retentive areas and path of insertion were again found with the model horizontal. Ideal conditions were available for conventional type clasps on the right first bicuspid and second molar, and the left second bicuspid and second molar. To insure maximum stability for the denture and the remaining teeth, a wide type lingual bar was planned to rest above the cingulum of the anterior teeth, extend over the incisal area of the left cuspid, and continue posteriorly to reciprocate the buccal clasp arms on the bicuspid teeth. The remaining incisor teeth did not require onlays to reach the new occlusal plane. All gingival areas were relieved and undesired undercuts waxed out. The model was duplicated in investment material and mounted against the upper master model.

Some type of occlusal guide was now necessary before the so-called inlays could be waxed as part of the casting. The following technic was devised. The template was positioned and securely waxed to the lower model and a set of upper posterior teeth was accurately set up against the template and waxed to the upper model. This required considerable grinding on the diatoric side as it was desired to retain all occlusal anatomy. The template was now removed and the new plane of occlusion permanently established. The occlusal surfaces of all lower posterior teeth were covered with one sheet of 30 gage green wax and the inlays were carved to occlude with the upper porcelain teeth. The remainder of the waxing was now completed and cast and the polished framework was seated on a duplicate lower stone model and articulated with the upper master model carrying the temporary porcelain setup. The inlays now formed a portion of the occlusal surface of the lower pads and the remainder was carved in wax, processed in tooth-color

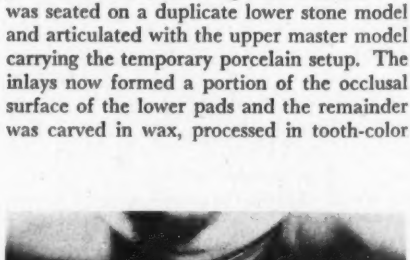


Fig. 6.—The median line conforms to the mark on the bite rim rather than to the lower central incisors

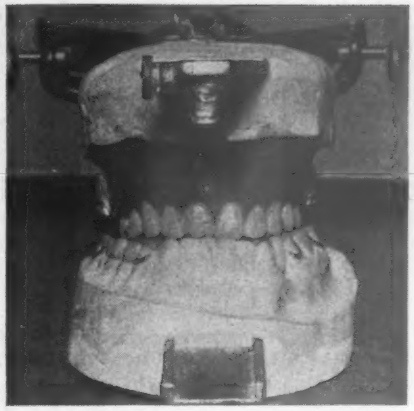


Fig. 7.—The dentures articulated on the cast. The lower plate is complete; the upper plate is ready for a try-in

acrylic resin and completed. Before undertaking the upper plate, it was decided to return the lower plate for try-in and to request a simple bite test and lower model, both with the denture in place.

A comprehensive survey of the upper plate having been made on the study model, no further changes in design were considered. Mounted on the surveyor with the same posterior tilt, the undesirable undercuts were eliminated with wax and all gingival areas relieved but no relief was placed over the saddle areas for retention of the acrylic resin as this would prevent the bite rim from seating. The upper model of investment material was then articulated against the new lower model with the denture in place. Waxing of the upper inlays was greatly simplified by working directly against the completed lower plate. However, no attempt was made to make opposing inlays identical in size as a safe margin against closing the bite through mastication was all that was required.

About 60 per cent of the masticating surfaces were either gold against gold, or gold against porcelain. Should excessive wear occur where acrylic resin occludes with acrylic resin, contact can be restored by curing additional material over the worn areas.

Fig. 8.—The patient wearing the adjusted dentures. Compare lip and cheek contours with those in Figure 1

The occlusal areas of all posterior teeth were covered with one sheet of 30 gage wax which extended over the lingual surface to the gingival margin and finish lines were provided over the occlusal-lingual angles. The waxing was completed and acrylic retention obtained by lifting the wax away from the model. After being cast and polished, the framework was placed on a duplicate stone cast and mounted. The four incisors previously made of acrylic resin were now set up as planned, followed by porcelain cuspids and bicuspids. Little grinding was needed to place the right second bicuspid over the natural tooth and so it remained in the finished denture. After carving of the molar teeth in blue inlay wax, the dentures were again returned for try-in (Fig. 7).

Minor changes were made in the anterior teeth for increased esthetics and additional wax was placed over the cuspid areas. The teeth were then returned to the laboratory for completion by accurate reproduction of the wax pattern.

The patient is very well pleased with his greatly improved appearance (Fig. 8) and masticating efficiency.—*1801 Eye Street, N.W., Washington.*

U. S. Incomes.—In a second study of income distribution the Federal Reserve Board recently found that 47 per cent of American families received less than $2,000, 70 per cent less than $3,000, and only 3 per cent have $7,500 before taxes.

BOOK REVIEWS

The Science of Dental Materials. By Eugene W. Skinner, Ph.D., professor of physics, Dental School, Northwestern University. Ed. 3. 410 pages. Price $4.75. Philadelphia and London: W. B. Saunders Company, 1946.

This edition of "The Science of Dental Materials" has been revised to include data made available on dental materials during wartime years, and the author indicates that the use of substitute materials necessitated by emergency conditions may cause many of these recent data to prove temporary in nature. The author's preface indicates that the chapters on acrylic denture resins have been completely rewritten and that new chapters have been added to cover recent developments, such as the alginates and acrylic resins for individual tooth restorations.

This textbook has been practically the only one available in recent years which has made a comprehensive attempt to cover the available data on the properties and characteristics of most of the types of materials used in dental restorations and technics. It brings together data from almost every available source, and its chapter bibliographies are extensive enough to serve as guides for the person who wishes to do additional reading on any particular type of material.

Dental students as a group have little background training for an intensive study of the physical characteristics of the many types of materials used in the dental field. This book has devoted several chapters to the basic science required, but the coverage is not broad enough to do more than direct the students' attention to possible sources of basic scientific methods and principles, as we presume the author intended.

From the viewpoint of the individual undergraduate student, it may well appear that the book carries too much in the way of extensive tables and quoted conclusions from many sources and less explanatory material and practical application of the data given than is desirable. More advanced students or persons who have sufficient practical experience to permit their visualizing or stating their own problems will find that the data presented are, for the most part, adequate to indicate the proper solutions.—*N. O. Taylor.*

Annual Reports: How To Plan and Write Them. By Beatrice K. Tolleris, staff consultant, National Publicity Council. 40 pages. Paper. Price $1.00. New York: National Publicity Council, 130 East Twenty-Second St., 1946.

This pamphlet will be extremely helpful to those who face the planning and writing of an annual report. The organization of facts, the adaptation of the material to the prospective audience and the relating of the story are well handled in three brief chapters. The use of statistics and the physical format of the report are also considered, and appropriate suggestions are given for both the experienced and amateur writer.

This pamphlet is one of a series which contains, among others, these interesting titles: "Bulletins—How To Make Them More Effective"; "Exhibits—How To Plan and Make Them"; "Planning Your Meeting"; and "Working with Newspapers." The series is written by various persons with experience in the field of health and welfare services, so that these pamphlets will be more helpful to dentists than will others which cover a wider field.

Oral Health. By H. Shirley Dwyer, D.D.S., director, Division of Dental Services, New Hampshire State Department of Health. 132 pages. 14 illustrations. Cloth. Price $1.25. Philadelphia: W. B. Saunders Co., 1945.

"Oral Health" was prepared to supplement the nurse's medical knowledge with certain essential dental information. Its eight chapters deal with the growth and development of the teeth and jaws, diseases of the hard and soft tissues of the mouth and the prevention and control of those diseases. One chapter gives special consideration to the duties of the public health nurse in a dental program and one is devoted to health education.

There is a distinct need for a practical authoritative dental health manual for nurses, but it is doubtful whether "Oral Health" will meet that need. While it presents much that is commendable, it also contains many statements that will not be accepted by medical and dental authorities. At the statement that emotional disturbances of the mother during pregnancy may alter the coalescence of the deciduous tooth cusps, the reader will put his tongue in his cheek. When he reads that secondary dentin is a pathologic deposit of dentinal structure, he will become skeptical. When he reaches the statement that "in most cases, corrective orthodontic treatment is not indicated until the child is between eleven and thirteen years of age," his skepticism will turn to criticism. These are but a few of the avoidable errors in the book.

It is not to be assumed that the text is preponderantly bad. On the contrary, it contains much helpful information, but its pages bear a sufficient number of unscientific statements to prevent its being as useful as it should be. Had the author permitted a number of specialists to review the manuscript, most of the misstatements could have been avoided. Errors have a habit of coming to light, and it is much better to detect them in a manuscript than to reveal them in a book review.

The chapter on the public health nurse in a dental program deals too exhaustively with dental operative procedures. This information is more valuable to dentists than to nurses. The chapter on health education is well written and informative.—*Lon W. Morrey.*

German for the Scientist. By Peter F. Wiener, modern language master at Rugby School. With an introduction by E. N. da C. Andrade, D.Sc., Ph.D., F.R.S., Quain professor of physics, University of London. First American Edition, with additional sections and foreword by Paul Spoerri, Ph.D., Polytechnic Institute of Brooklyn. 238 pages. Cloth. Price $3.50. Brooklyn: Chemical Publishing Co., Inc., 1946.

After an interval made necessary by the war, German technical literature will soon become available again in this country. This literature, in the past, has been essential to every thoroughgoing student of the sciences. The present volume provides a good introduction for those who wish to refresh their reading knowledge of the language. One section is devoted to grammatical principles. While this section is not exhaustive, it can readily be supplemented by larger works. The major part of the book is devoted to fairly extensive excerpts from scientists such as Einstein, Max Planck and Arnold Eucken. Translations of these sections appear at the back of the book. There is also a fairly extensive vocabulary.

The direct usefulness of this book to the dentist is limited because the quoted passages deal only with the language of chemistry and physics. It will be helpful, however, for anyone who wishes to explore the work of German authorities in the basic sciences.

Distribution of Dentists in North Carolina. By Selz C. Mayo. Report No. RS-7, North Carolina Agricultural Experiment Station. 19 pages. Mimeographed. Raleigh, N. C.: North Carolina Agricultural Experiment Station, 1946.

This report presents a detailed analysis of the dental personnel resources in North Carolina, and discusses the dental health problems facing the state in terms of the present enrollment of North Carolinians in dental schools, the distribution of dentists throughout the state, the position of North Carolina among the states, national dental needs and proposed legislation.

On June 1, 1945, there were 714 active dentists in North Carolina, resulting in a ratio of 5,002 persons for each dentist. In this connection, the author made the interesting discovery that every state with a dental school had a lower ratio than North Carolina, which has no dental school. The future outlook for increasing the number of dentists in the rural districts is far from optimistic. The report stated: "Assuming that the dentists who left rural areas for service will return, there will be 250 dentists to serve the rural population; and the remaining 676 will be in urban centers. This means that 27 per cent of the dentists will be in rural areas and 73 per cent in urban; but, this is an almost exact reversal of the proportion of the population in the areas. It should be noted that 67 of the 68 active Negro dentists are in urban areas and 41.2 per cent are in the five largest urban centers of the state." Of special interest is the fact that over 29 per cent of the rural dentists entered mili-

tary service, while only about 20 per cent of the urban dentists were called.

Dentists and others interested in health program planning or location survey activities may be interested in knowing that several other state universities and agricultural experiment stations have engaged in similar studies over the past few years. It would appear to be of value for such groups to consider the resources and technical assistance available from such public agencies in carrying on similar studies in the future.—*J. E. Bagdonas.*

Health Practice Indices, 1943-44. Prepared by the Committee on Administrative Practice of the American Public Health Association, under the direction of George T. Palmer, D.P.H., associate field director of the American Public Health Association. Distributed free. New York: American Public Health Association, 1945.

The unsatisfactory position of dentistry in community health practice is clearly illustrated in this publication. The author reports on evaluation of health services in eighteen states in the years 1943 and 1944. Health programs were appraised in terms of personnel, hospital facilities, communicable diseases, levels of personal health and sanitation. No consideration was given to dental personnel or to the status of dental health in the communities. Dental health problems were evaluated, half-heartedly, in terms of the percentage of preschool and school children receiving corrective dental treatment. The attitude of health officers who submitted data on the dental aspects of the public health problem is illustrated by the totally inadequate reports on dental needs.

The book will be a disappointment to those who recognize the importance of dental health in the generalized health program. The author apparently disregarded his own objectives for making the study. For example, he states: "It should be emphasized that the Evaluation Schedule is designed to reveal the health protection of a community as a whole. . . . The inventory serves as a basic plan on which to build improvements. It provides knowledge of the existing situation which is essential as the starting point for corrective steps. A state director of local health service with such a listing can discuss a local situation with pertinent facts at his command and with similar facts from other communities as a comparative background."

This reviewer maintains that corrective steps for the improvement of dental health cannot be taken if appraisals of dental needs are as rudimentary as those included in the investigation; that a health officer cannot competently discuss a local dental situation with community groups by referring to the meager evidence presented in this report, and, finally, that investigators and consultants on public health problems cannot adequately assist local health agencies in making surveys if they do not include essential data on the most important of all health needs.—*Allen O. Gruebbel.*

Nutrition and Chemical Growth in Childhood. Vol. II, Original Data. By Icie G. Macy, Ph.D., Sc.D. 1,027 pages. 705 illustrations. Price $5.00. Springfield, Ill.: Charles C. Thomas, Publisher, 1943.

Volume II of this series on "Nutrition and Chemical Growth in Childhood" is primarily a compilation of original data which will be analyzed and integrated in Volume III. The volume contains 1,027 pages of data, including 471 tables and 705 figures, obtained from the longitudinal studies on 33 normal children. Comparative data on four abnormal children are also included. The data consist of the medical histories and pictures of the subjects; chemical analyses of food, urine and feces for consecutive balance periods over months for the same group of children and at different age levels for some children; anthropometric measurements; hemato-chemical determinations; actual size reproductions of roentgenograms; medical and dental examinations; basal metabolism determinations; and psychometric evaluations.

As presented, this volume would be of little value except to a very few investigators in growth. This is well recognized by the author, who will analyze and integrate these data in a subsequent volume. Its publication will be awaited with great interest.

The illustrations are reproduced with unusual clarity, particularly the roentgenograms. —*Isaac Schour.*

CURRENT LITERATURE

Bimaxillary Protrusion. Samuel J. Lewis. Angle Orthodont. 13:51, July-October 1943.

Bimaxillary protrusion was first described by Case in 1897. Later Simon described it and classified it into several categories, outlining his suggested treatment of removing the first bicuspids and retracting the anterior teeth. Tweed, in his treatment, removed all four first bicuspids and retracted the anterior teeth. In the treatment of this type of case, all writers agreed that, in order to establish a stable denture and to improve facial appearance, it was necessary to sacrifice dental units. The author describes briefly the technic involved, but refers the reader to a paper by Tweed on treatment. The introduction of the Kesling loop for moving the cuspids distally before attempting to bring back the incisors is described.

Journal of Dental Research
June 1946

Titles marked with an asterisk (*) are reviewed below.

*Dental Status of 71,015 Naval Personnel at First Examination in 1942. C. A. Schlack, J. S. Restarski and E. F. Dochterman, National Institute of Health, Bethesda, Md.—107.

*Clinical and Bacteriological Studies of the Use of a Fluoride Dentifrice. Edward O. Shaner, Washington, and R. Reed Smith, Springfield, Mo.—121.

*Decay of the Deciduous Teeth of Formosa Chinese. An Analytical Summary and Interpretation of Certain Statistics Published by Maruyama. V. O. Hurme, University of Illinois.—127.

*Hydrolyzed Saliva as a Source of Nutrients Essential for the Production of Acid by an Oral Strain of Lactobacillus Acidophilus. David Weisberger, Harvard School of Dental Medicine, Boston.—137.

*The Appositional Life Span of the Enamel and Dentin-Forming Cells. I. Human Deciduous Teeth and First Permanent Molars. Maury Massler and Isaac Schour, University of Illinois.—145.

Dental Status of 71,015 Naval Personnel at First Examination in 1942. C. A. Schlack, J. S. Restarski and E. F. Dochterman.

The number of persons showing simple and compound cavities and restorations, teeth missing and teeth to be extracted, varied significantly according to their region of birth in the United States. Generally speaking, more persons born in the New England and Middle Atlantic regions were dentally defective than those born in the West South Central and East South Central regions, particularly in the younger age groups. Examples of the high and low extremes in regional standard percentages of persons with one or more of the type of dental defect are: simple restorations: Middle Atlantic, 77.6 per cent, and West South Central, 40.2 per cent; compound restorations: Middle Atlantic, 63.1 per cent, and West South Central, 27.9 per cent; simple cavities: New England, 71.4 per cent, and West South Central, 61.7 per cent; compound cavities: New England, 46.7 per cent, and West South Central, 30.0 per cent; teeth missing: Middle Atlantic, 95.3 per cent, and West South Central, 84.0 per cent; teeth to be extracted: South Atlantic, 14.7 per cent, and Pacific, 5.1 per cent.

The percentage of persons with restorations (fillings) and missing teeth was greater in the older age groups than in the younger groups, while the percentage of persons with cavities and teeth to be extracted was greater in the younger groups than in the older. These findings agree with the impressions gained in dental practice. Examples of the high and low extremes in age group percentages of persons with one or more of the type of dental defect are: simple restorations: persons 30-34 years of age, 71.7 per cent, and persons 17-19 years of age, 48.6 per cent; compound restorations: persons 30-34 years of age, 64.0 per cent, and persons 17-19 years of age, 31.4 per cent; simple cavities: persons 17-19 years of age, 75.5 per cent, and persons 40 and over, 37.1 per cent; compound cavities: persons 20-24 years of age, 39.0

per cent, and persons 40 and over, 26.8 per cent; teeth missing: persons 40 and over, 95.2 per cent, and persons 20-24 years of age, 86.8 per cent; teeth to be extracted: persons 17-19 years of age, 11.9 per cent, and persons 35-39 years of age, 6.3 per cent.

Clinical and Bacteriological Studies of the Use of a Fluoride Dentifrice. Edward O. Shaner and R. Reed Smith.

Clinical observations made on the use of a fluoride dentifrice containing 0.5 per cent sodium fluoride showed that daily use over a period of a year produced some desensitization of sensitive cervical areas of teeth affected with gingival recession. Observations were made on 200 subjects. In no case was there any irritation of the gingivae, nor was there any pathologic condition which could be traced to the fluoride dentifrice. Lactobacillus counts taken on forty-seven patients showed that ten of thirty-two subjects using the fluoride dentifrice exhibited a significant decrease in the Lactobacillus count after using the dentifrice for one month. Lactobacillus counts in a control group of fifteen patients using a fluorine-free dentifrice showed no significant change. The experiment was conducted under close supervision and surveillance in a controlled group of adult subjects.

Decay of the Deciduous Teeth of Formosa Chinese. An Analytical Summary and Interpretation of Certain Statistics Published by Maruyama. V. O. Hurme.

Occidental literature contains exceedingly few articles dealing with the endemiology of dental diseases in the Far East. The report published by Maruyama in 1932 furnishes particularly valuable raw material for the biometrician. The data on 1,511 children ranging from 1 to 15 years of age are strongly suggestive of a relationship between the rate of dental maturation and the decay of the deciduous teeth. This impression is strengthened by an analysis of Ottofy's data on 500 Filipino children examined in 1902.

Computations based on data on the eruption times of deciduous and permanent teeth of Caucasians indicate that the standard deviations of age distributions of eruption are from three to five times greater for the permanent than for the deciduous teeth. Thus it is impossible to explain the higher frequencies of decay of the deciduous teeth of children who exfoliate these teeth early in terms of longer periods of mouth exposure. This conclusion assumes added significance in view of the fact that it is impossible to defend the thesis according to which disease involving the deciduous teeth could act as a stimulant for the accelerated eruption of their permanent successors.

Hydrolyzed Saliva as a Source of Nutrients Essential for the Production of Acid by an Oral Strain of Lactobacillus Acidophilus. David Weisberger.

Previous experiments have shown that whole saliva did not provide certain growth factors in a synthetic medium for an oral strain of Lactobacillus acidophilus. The deficiency in whole saliva was primarily associated with the unavailability of amino acids, especially tryptophane. In the present study, whole saliva was hydrolyzed by means of hydrochloric acid and also by barium hydroxide. After such treatment, the acid hydrolyzed saliva could then be substituted for casein hydrolyzate in the synthetic medium and the alkaline hydrolyzate could substitute for both casein hydrolyzate and tryptophane. These latter findings support the belief that these nutrients are present in whole saliva but are not in an available form for the growth of Lactobacillus acidophilus.

The Appositional Life Span of the Enamel and Dentin-Forming Cells. I. Human Deciduous Teeth and First Permanent Molars. Maury Massler and Isaac Schour.

The functional life span of the ameloblasts and the dentin-forming cells was obtained by measuring the total length of the individual enamel rod or dentinal tubule and dividing by the experimentally derived rate of appositional growth. The life span of the ameloblasts ranges from a maximum over the growth center to zero at the cemento-enamel junction. The life span of the dentin-forming cells is relatively constant for a particular tooth.

Overbite and Vertical Facial Dimensions in Terms of Muscle Balance. Wendell L. Wylie. Angle Orthodont. 14:13, January-April 1944.

Previous investigations have demonstrated that, when the teeth are in occlusion, the

distance from the chin-point to the floor of the nose contributes approximately 57 per cent of the total distance from the chin-point to nasion in most persons; the samples were all randomly selected from the general population. This study concerns a sample randomly drawn from orthodontic patients and measured by cephalometric roentgenography. Because closure of the bite is often an orthodontic problem, it was suspected that the lower face height in the orthodontic patients would be relatively less than that in the general population. The suspicion was confirmed, for the mean lower face height for the orthodontic cases was found to be 54 per cent and the difference between the means was highly significant statistically. These dimensions were obtained not only with the teeth in occlusion but also with the jaws in the physiologic rest position. The deficiency in lower face height in closed-bite cases obtains not only when the jaws are closed, but also when the teeth are separated in the physiologic rest position; the mean is significantly less for this group than the rest-position mean for the general population. The coefficient of correlation between lower face height in occlusion and lower face height in the rest position is +0.91. It is apparent that closure of the bite is not entirely dependent on undereruption of posterior teeth or overeruption of anterior teeth, since the deficiency obtains when the teeth are not in occlusion, and it is suggested that the position of the teeth in the denture space with respect to vertical height is largely affected by the morphogenetic muscle pattern of the individual.

Force Control in the Movement of Dental Structure: A Technique Designed To Apply Its Principles. C. W. Carey. Angle Orthodont. 14:47, July-October 1944.

The efficient control and utilization of forces in orthodontic treatment are of great importance to the successful result. By elimination of antagonistic forces in mechanisms used in the movement of dental structures, more freedom of motion is obtained. This allows a shorter treatment period, a minimum of discomfort to the patient, less tissue destruction and more favorable retention. The mechanism devised for this purpose consists of two side sections of rectangular arch material which engage the buccal surfaces of the teeth and which are joined to an anterior section of fine gage twin wire by means of a friction sleeve on each side permitting freedom for extension. The anterior teeth are free from contact with arch wires until the termination of treatment. Partial self-alinement of these teeth takes place as the posterior teeth are being moved in a distal direction. The opposing arch is stabilized by rigid bracket engagement to prevent motion. The mechanics and philosophy of this treatment are based on the belief that a highly resilient, easily extended arch wire allows more freedom for tooth movement of the posterior sections than the continuous, more rigid arch wires and that the means of providing the anterior teeth the space for self-alinement produces more favorable esthetics and retention.

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Titles marked with an asterisk (*) are reviewed below.

*Pentothal Sodium Anesthesia Using Automatic Control Syringe Method. L. B. Stallcup, D.D.S., Phoenix, Ariz.—1.

Submaxillary Adenitis, Embedded Teeth and Deviation Deformity of the Mandible. Eugene V. Linsey, D.D.S., Cleveland.—16.

*Surgical Removal of Displaced Third Molar Crown. Robert N. Knutson, D.D.S., Pasadena, Calif.—20.

Neuroma of Palate: Report of a Case. George W. Christiansen, A.B., D.D.S., M.S., and James L. Bradley, D.D.S., M.S.D., Bethesda, Md.—24.

*Osteoma of the Mandibular Condyle with Deviation Prognathic Deformity: Report of Case. H. G. Worman, D.D.S.; C. W. Waldron, M.D., D.D.S.; and Dorothea F. Radusch, M.A., D.D.S., Minneapolis.—27.

*Mandibular Osteomyelitis: Its Diagnosis and Treatment. William E. Durbeck, D.D.S., San Antonio, Texas.—33.

*Care of the Surgical Patient. G. Victor Boyko, D.D.S., M.S., Paterson, N. J.—40.

*Compound Composite Odontome of the Mandible. C. W. Waldron, M.D., D.D.S.; Ralph G. Peterson, D.D.S.; and H. G. Worman, D.D.S., Minneapolis.—48.

*Osteogenic Sarcoma of the Maxilla: Report of Case. L. R. Boies, M.D.; R. G. Peterson, D.D.S.; C. W. Waldron, M.D.,

D.D.S.; and K. W. Stenstrom, Ph.D., Minneapolis.—56.

*Surgical Treatment of Mandibular Prognathism. Carl W. Waldron, M.D., D.D.S.; Ralph G. Peterson, D.D.S.; and Charles A. Waldron, D.D.S., Minneapolis.—61.

Pentothal Sodium Anesthesia Using Automatic Control Syringe Method. L. B. Stallcup.

Stallcup has used pentothal anesthesia extensively in the extraction of teeth since 1940. He seldom uses local anesthesia and uses only nitrous oxide-oxygen for children under 7 years of age. The technic of administration and the apparatus used are described and illustrated. Physical properties, systemic effects and contraindications, such as shock, hypotension, degenerative heart disease and Ludwig's angina, are briefly considered. In the office the only premedication used is atropine sulfate.

The author discusses the method of preparation of a 5 per cent and a 2.5 per cent solution of pentothal sodium; these solutions are made up beforehand and may be used over a considerable length of time. For primary induction, 5 cc. of the 5 per cent solution is used in a small syringe and a 23 or 24 gage needle is used for venipuncture. After this operation the venipuncture needle is connected to a specially constructed and controlled syringe. This syringe, by a set of valves, allows a continuous flow of physiologic sodium chloride solution which may at any time be interrupted for the introduction of more 2.5 per cent solution of pentothal sodium.

Stallcup lists the following advantages of this system of administration: (1) with the use of the physiologic sodium chloride solution a smaller gage needle can be used; (2) the constant flow of saline solution prevents clogging of the needle; (3) the fluid level of the body is kept constant; (4) the blood pressure remains more nearly constant; and (5) there is much less chance of postoperative shock.

Laryngeal spasm is the most common emergency arising from pentothal anesthesia. This is commonly brought on by the collection of mucus or blood in the pharyngeal area, and usually happens when anesthesia is light. It is overcome by administering a small additional amount of pentothal and then placing the nose adaptor on the face and forcing oxygen under pressure through the nose and into the pharyngeal area. The tongue is then brought forward and the saliva and the foreign material are aspirated. Oxygen may then be forced into the lungs by covering the mouth. A tongue suture may be used to hold the tongue forward. Caffeine sodium benzoate, 2 cc., is administered intravenously when the anesthesia becomes too deep or the patient becomes exhausted. Coramine and picrotoxin are also on the emergency tray.

Stallcup concludes that pentothal sodium anesthesia is easy to give and extremely safe when administered properly and with the right type of equipment.

Surgical Removal of Displaced Third Molar Crown. Robert N. Knutson.

A case is described in which, in the elevation of an impacted lower third molar, the crown portion of the tooth was surgically displaced into the lingual tissues of the floor of the mouth.

Osteoma of the Mandibular Condyle with Deviation Prognathic Deformity: Report of Case. H. G. Worman, C. W. Waldron and Dorothea F. Radusch.

The authors report a case of osteoma of the condyle that apparently began at the age of 12 and over a period of six years attained such a size as to cause deviation and prognathic deformity of the mandible with malocclusion. From x-ray studies it was concluded that the growth was a benign osteogenic tumor rather than an exostosis. The tumor was surgically excised and found to be of such a size that it became necessary to separate a portion of the zygoma to remove it. A false joint was produced and the teeth were wired in normal occlusion. Excellent functional and esthetic results were obtained.

Mandibular Osteomyelitis: Its Diagnosis and Treatment. William E. Durbeck.

The history of treatment of mandibular osteomyelitis and the symptoms and local and general findings concomitant with the disease are discussed. According to Key, the offending organism in 90 per cent of the cases is Staphylococcus aureus. The author describes the pathologic development of the disease and the roentgenographic findings, and recommends the parenteral administration of peni-

cillin up to 100,000 units a day and surgical intervention when sequestration may be demonstrated. He prefers the external approach for the removal of sequestra and, after excision of diseased tissue, he fills the defect with sulfanilamide powder and closes the wound without packs or drains.

Care of the Surgical Patient. G. Victor Boyko.

The importance of history-taking and adequate examination of the patient prior to any oral surgical procedure is stressed.

One of the most troublesome postextraction symptoms, which causes apprehension to the patient and inconvenience to the dentist, is persistent bleeding over a prolonged period of time. Recent clinical research in the use of fibrin foam with thrombin, and absorbable gelatin sponge and thrombin, for hemorrhage holds great promise for application in oral surgery.

Sulfonamides have been used for local application in oral therapy with a variety of results. The accumulated war experience in the local use of sulfonamides in the care of wounds does not justify their employment, and therefore their local use has been discontinued.

With the advent of penicillin the treatment of oral infections has entered a new phase, with startling results in some cases. To date, the parenteral introduction of this drug is the preferred method. More recently, oral and local application have been utilized with some good effects.

Compound Composite Odontome of the Mandible. C. W. Waldron, Ralph G. Peterson and H. G. Worman.

In a case of composite odontome of the mandible, the first operation for excision was performed under nitrous oxide-oxygen anesthesia and, because of the fusion of the tumor mass to the bone, only a partial resection was accomplished. Three months later a second operation was performed under ether intrapharyngeal anesthesia. As was anticipated, the complete vertical loss of bone at the region of the angle resulted in a pathologic operative fracture, which made removal of the remaining tumor of the ramus much more time-consuming since the posterior fragment became mobile and difficult to hold. During the attempt to remove the last remaining portion of the tumor from the region of the base of the condylar process, the entire condyle was pulled out of its periosteum and into the oral cavity. The teeth were wired in occlusion and the wound was packed with a lubricant iodoform gauze packing.

Three and one-half months after the operation, x-ray examination showed union of the fracture at the angle with some forward displacement of the ramus and complete regeneration of the head of the condyle. At present the patient presents virtually no deformity, and the function of the lower jaw is almost normal. There is no evidence of fifth nerve anesthesia or paresthesia of the teeth and lip.

A contributing cause of the accidental extrusion of the condyle neck and head from its periosteal coverings was probably an uninfected inflammatory edema of the periosteum, which weakened its attachment. The osteogenetic function of the periosteum was apparently undamaged, as evidenced by the degree of regeneration.

Osteogenic Sarcoma of the Maxilla: Report of Case. L. R. Boies, R. G. Peterson, C. W. Waldron and K. W. Stenstrom.

A girl, aged 12, was first seen after a biopsy of the tissues involved in enlargement of the left side of the maxilla had resulted in a diagnosis of sarcoma. Two subsequent operations and biopsies failed to yield a similar diagnosis. Enlargement of the area a year later resulted in another operation, and tissue of fleshy consistency was recovered. This tissue proved to be osteogenic sarcoma. Surgery of the area was considered too hazardous and mutilating, and roentgen therapy was instituted. The patient received 2,100 r (air) units in eighteen treatments over a period of twenty-nine days.

Months of survival and normal health and development after the x-ray therapy, together with evidence of bone regeneration of the maxilla, lend hope that the case may continue free from recurrence.

Surgical Treatment of Mandibular Prognathism. Carl W. Waldron, Ralph G. Peterson and Charles A. Waldron.

The need of extensive study of individual cases of prognathism where surgery is contemplated to correct the deformity is discussed

in some detail. Special studies include photographic records, roentgenograms (which should always include the condyles in order to rule out osteoma and to show displacement of condyle heads where orthodontic treatment may have preceded the present examination) and dental casts. Several measurements and observations follow these studies, prior to any surgical procedure. The authors use a ball and socket articulator, with the mandibular cast, instead of the maxillary cast, being mobile. They pay considerable attention to the Frankfort plane in their preoperative studies and use it in determining the line of dissection during operation.

The authors state that in the majority of cases there is no appreciable underdevelopment of the maxillary arch or overdevelopment of the mandibular arch, and in these cases simple division of the rami effects material improvement of the facial contour at the angles.

The authors prefer the ramus as the site of election for surgery when there are no specific indications for a foreshortening of the body of the jaw. The slide-back of the lower margin of the division is limited to not more than two-thirds of the width of the horizontal diameter of the ramus because of the risk of nonunion or malunion with open bite displacement.

They prefer the open surgical approach in osteotomy of the ramus. They use the Jacob's nasal saw for division, but they believe that a type of small vibratory motor saw can be devised to facilitate and speed up the division of the jaw. They have not used the Gigli saw and list four reasons why they have not attempted to use it. They mention the intraoral method of Moose and state that it may be difficult to divide the ramus in the horizontal plane, if such is indicated, or in a predetermined variation from the horizontal plane.

In summary, it is their opinion that an open view operation is essential in order that the predetermined distance of the setback of the jaw may be obtained without displacement of the upper coronoid condyle fragment.—*Herman L. Hubinger.*

Betel Chewing Among Natives of the Southwest Pacific Islands. Lack of Carcinogenic Action. M. J. Eisen. Cancer Res. 6:139, March 1946.

Betel chewing is practiced by nearly all of the natives of New Guinea, New Britain, New Ireland and the neighboring smaller islands. The components of the betel include the betel nut, the leaves or pod of the piper betel and lime. Only one case of squamous cell cancer of the oral mucosa was observed in 8,000 natives of Northeast New Guinea. Similarly, of 4,000 admissions in Papua, only one case of a squamous cell epithelioma of the tongue was observed. Additional data are cited. It is the author's impression that no unusual incidence of oral lesions occurs among this group of natives and that betel chewing does not appear to elicit cancer of the mouth. Since the betel chewing habit is so widely practiced among the peoples in question, it is obviously impossible to determine the frequency of tumors of the mouth in a comparable series of nonchewing controls.—*J. E. Gilda.*

Odontogenic Tumors. A Classification Based on Observations of the Epithelial, Mesenchymal and Mixed Varieties. K. H. Thoma and H. M. Goldman. Am. J. Path. 22:433, May 1946.

The odontogenic tumors are classified into three groups as follows:

1. Epithelial tumors
   - Adamantoblastoma
   - Enameloma
2. Mesenchymal tumors
   - Odontogenic fibroma
   - Dentinoma
   - Cementoma
3. Odontogenic Mixed Tumors (Odontomas)
   - a. Soft odontoma—epithelium and mesoderm
   - b. Soft and calcified odontoma—adamantoblastoma arising in conjunction with a forming or completely formed odontoma; all types of histologic variations due to inductive effects of one tissue or another
   - c. Completely formed odontoma with enamel, dentin, pulp, cementum and periodontal membrane
     - Compound (many small teeth)
     - Complex (irregular tooth structure)

The above tumor types are described and differentiated. The article is accompanied by pertinent data from sixty-four cases of odontogenic tumors and is well illustrated.—*J. E. Gilda.*

LIST OF DENTAL OFFICERS

SEPARATED FROM ARMY DENTAL CORPS

THE following list of dental officers separated from the Army Dental Corps does not include rank because such information is no longer furnished by the Surgeon General's Office. Publication will be given to other names as soon as possible.

Alabama	
Anniston	Rodgers, Gordon A., Jr.
Anniston	Yalovitz, Marvin S.
Birmingham	Naftel, James C.
Tuscaloosa	Tyler, Jesse M.
Arizona	
Flagstaff	Lindemann, Peter J., Jr.
Arkansas	
Fayetteville	Gardner, John M.
Malvern	Richardson, William H., Jr.
California	
Alameda	Ashuckian, Edward S.
Auburn	Adams, Herbert H.
Berkeley	Reynolds, Robert V.
Chico	Bartram, Vern M.
Exeter	Graves, Van Morris
Fresno	Bohigian, Victor
Glendale	McMillan, William N., Jr.
Hollywood	Lopez, Victor E.
La Canada	Johns, Llywolaf, Jr.
Los Angeles	Barbanell, Alvin H.
Los Angeles	Holt, Harold J.
Los Angeles	Margaretten, Joel
Los Angeles	Morris, Samuel H.
Los Angeles	Ridley, Albert J.
Los Angeles	Robinson, Horace C.
Oakland	Helfrich, Frank B.
San Francisco	Briones, Lester N.
San Francisco	Gonzalez, Antonio J.
San Francisco	Jacobson, Paul H.
San Francisco	Karnes, Thomas W.
San Francisco	Klein, Curtis A.
San Francisco	O'Connor, Gerald T.
San Francisco	Sellman, William R.
San Jose	Rhoads, John E.
Whittier	Jenkins, Ole M.
Colorado	
Denver	Bolstad, Paul F.
Denver	Patberg, Noble F.
Morgan	Tibbetts, Donald W.
Connecticut	
Hartford	Mass, Calvin
Naugatuck	Weiss, Lester B.
Stratford	Shuchat, Herman
Waterbury	Santopietro, Andrew E.
Delaware	
Milford	Reed, Robert A.
Wilmington	Laskaris, George P.
District of Columbia	
Washington	Maizels, Albert D.
Florida	
Chipley	Tiller, Howard B.
Daytona Beach	Sternberg, Sam
Gainesville	Emerson, Jesse R.
Miami Beach	Finn, Leonard H.
Palm Beach	Blicher, Barney
Plant City	Compton, Kendall D.
Tallahassee	Vason, Robert F.
Tampa	Moreno, Ruben
Georgia	
Atlanta	Mizell, George C., Jr.
Atlanta	Walker, James O.
Douglas	Durden, Whit H.
Jackson	Harrison, Robert P.
Moultrie	Cannon, Jack T.
Idaho	
Blackfoot	Hamilton, Berger W.
Boise	Morene, Albert
Caldwell	Adams, William K.
Illinois	
Ashley	Hagebush, Oscar C.
Berwyn	Komarek, Joseph
Carlinville	Bernhardt, Irwin H.
Chicago	Bardige, Myron W.
Chicago	Barrash, Jules M.
Chicago	Becker, Leonard H.
Chicago	Feldman, Arnold H.
Chicago	Goldenberg, Albert
Chicago	Holic, Richard
Chicago	Kloris, Matthew P.
Chicago	Korngoot, Maurice H.
Chicago	Kurland, Harry J.
Chicago	Meilach, Melvin M.
Chicago	Mitz, Ruben
Chicago	Olsen, Oscar J.
Chicago	Rozanski, Stanley A.
Chicago	Ryden, Ben
Chicago	Soldovnick, Jacob S.

Chicago	Wagner, Otto F.
Cissna Park	Danforth, Harry D.
Danville	Burke, John J.
Flora	Powell, Amos J.
Gillespie	LaBanc, John A.
Glen Ellyn	Quinlan, Jeremiah R.
Oak Park	Hooper, Melville J.
Quincy	Haffner, James E.
Shawneetown	Goetzman, Frederick P.
Springfield	Koratsky, Albert W.
Waverly	Lee, Robert E.
West Frankfort	Lambert, Guy W.
Indiana	
Connersville	Albright, Edward H.
Lebanon	Parr, Charles D.
South Bend	Helkie, Donald L.
Vevay	Pickett, William
Iowa	
Algona	Dewel, Robert C.
Mason City	Diercks, Clinton C.
Newton	Campbell, Leslie K.
What Cheer	Galbraith, Rufus B.
Kansas	
Emporia	Bruner, Hugh H.
Lawrence	McDermott, Bernard L.
Minneola	Van Blaricum, James W., Jr.
Kentucky	
Louisville	Sleamaker, Thomas W.
Newport	Kaurish, Howard W.
Louisiana	
Monroe	Johnson, Foraker W.
New Iberia	Tilly, Joseph A. G.
New Orleans	Diaz, Rafael E.
Maine	
Togus	Berliner, David
Maryland	
Baltimore	Heil, Roland W.
Catonsville	Levickas, Adolf T.
Towson	McDonald, Norval H.
Massachusetts	
Boston	Downes, Arthur B.
Dedham	Bailey, Robert M., III
Dorchester	Kennedy, Walter J.
Holyoke	Pereira, George A.
Lawrence	Meyers, Milton J.
Melrose	Diamond, Ralph B.
Peabody	Ryan, John W.
Revere	Goldberg, Jacob J.
Roxbury	Covel, Herbert
Springfield	Gottesman, Clifford P.
Michigan	
Battle Creek	Forster, Burton T.
Bay City	Ash, James D.
Detroit	Colvard, Fred L.
Detroit	D'Alleva, John P.
Detroit	DeSico, Philip A.
Detroit	Kaplan, Alex M.
Flint	Joseph, Michael C.
Lake Orion	Ketchell, Bertram
Lansing	Cleaver, Mervin C.
Minnesota	
Maynard	Peterson, Lee E.
Minneapolis	Bjoraker, Robert J.
Minneapolis	Rippe, Henry A.
St. Paul	Ewert, Roger A.
St. Paul	Hall, Kenneth H.
St. Paul	Monick, Robert I.
Mississippi	
Pontotoc	Abernethy, Wilbur M.
West Point	Abbott, John R.
Missouri	
Carthage	Short, Richard R.
Columbia	Hackley, Walter H.
Kansas City	Arrowsmith, George M.
Kansas City	Joy, John E.
Kansas City	Shira, Earl W., Jr.
Marshfield	Melton, George J.
North Kansas City	Brunner, John A.
St. Joseph	Howard, Melvin A.
St. Louis	Benning, Carl J.
St. Louis	Kloepper, Norman O.
St. Louis	Moberg, Carl V.
St. Louis	Rister, Carl L.
St. Louis	Schmidt, Gunter
University City	Borowik, Simon
Montana	
Missoula	McPhee, Angus S.
Nebraska	
Kearney	Raasch, Frank O.
Schuyler	Vlasak, George F.
West Point	Steffl, Matthew L.
Nevada	
Las Vegas	Hirsch, John B.
New Hampshire	
Concord	Young, William A., Jr.
New Jersey	
Dunellen	Francis, Allen M.
Elizabeth	Feldman, Francis
Haledon	Maupin, John E.
Jersey City	Holz, Stuart
Jersey City	Schapiro, Morton
Linden	Harris, Samuel B.
Long Branch	Alterman, David
Metuchen	Hecht, Sylvester J.
Newark	Marias, William J.
Newark	Taub, Charles
Passaic	Kirsh, Charles
Paterson	Markowitz, Aaron B.
Teaneck	Saviet, Stanley
Trenton	Fox, Joseph
Trenton	Winkler, Albert F.
New Mexico	
Albuquerque	Jacobson, Clarence R.
Deming	Byrne, James P.
Las Cruces	Haines, Benjamin H.
New York	
Binghamton	Faust, Carlton L.
Boonville	O'Brien, Edward F.
Bronx	Gordon, Leonard

Bronx	Kaufman, Morton
Bronx	Tenzer, Irving
Brooklyn	Axelrod, Arthur
Brooklyn	Eisenberg, Milton J.
Brooklyn	Israel, Harvey I.
Brooklyn	Jacobs, Albert L.
Brooklyn	Rampulla, John B.
Brooklyn	Schechter, Alexander
Brooklyn	Schreiber, Walter
Brooklyn	Stolzberg, Samuel
Corning	Buffomante, Angelo A.
Corona	Colucci, George J.
Corona	Hass, Harold
Elmira	Steere, James H.
Forest Hill	Gibson, Joseph A., Jr.
New York	Bukantz, Daniel
New York	Clemente, Nicholas V.
New York	Fishman, Leo A.
New York	Goldsmith, Jess
New York	Lieber, Leon
New York	Lipton, Irvin E.
New York	Newman, Philip H.
New York	O'Keefe, John J.
New York	Shuster, Harold M.
New York	Stelzer, Morris
New York	Warren, Monte M.
Niagara Falls	Pulvino, Thomas J.
Olean	Kaiser, Loren M.
Port Chester	Schwartz, Kenneth H.
Queens Village	Kelley, John B.
Rochester	Kuimjian, Leo A.
Rockville Center	Sorrentino, Jeremiah G.
Rome	MacCasland, Willis E.
South Fallsburg	Feldman, Milton
Sunnyside	Solomon, Arnold S.
Theresa	Hoover, Gerald D.
Weedsport	Herrling, Willard S., Jr.
White Plains	Walthausen, Warren, Jr.
Woodside	Seltz, Bernard

North Carolina

Concord	Reece, John P.

Ohio

Akron	Eichner, Sidney J.
Alliance	Roth, John
Ashtabula	Taano, Eugene A.
Cincinnati	Mulvey, John M.
Cincinnati	Schultz, Melvin
Cleveland	Leininger, Howard G.
Findlay	Misamore, Merritt D.
Hillsboro	Harrold, Joseph W.
Lima	Crawford, John E.
Orrville	Oberlin, Hoyt R.
Toledo	Bassett, David M.
Vermilion	Ross, Ralph M.
Wilmington	Hutchens, John C.

Oklahoma

Maud	Kuzel, LeRoy J.

Oregon

Ashland	Hull, George B.
Portland	Hammond, John H.
Portland	Roloff, Edwin H.

Pennsylvania

Allentown	Diefenderfer, Frank C., Jr.
Allentown	Groner, Karl J.
Ambridge	Harris, Woodford A.
Blawnox	Davis, Francis C.
Braddock	Magram, Isadore H.
Carnegie	Booth, William C.
Easton	Chain, Robert H.
Elizabethville	Fauber, John E.
Erie	Bruce, Robert J.
Farrell	Shafa, Hessameddin
Jessup	Sebastianelli, Almo J.
Keiser	Coroniti, Ferdinand R.
Lancaster	Law, Louis
McKees Rocks	Stayduhar, William G.
Merion Station	Katz, Samuel
Mt. Oliver	Taylor, John F.
Munhall	Virostek, Milan R.
Norristown	Smith, Peter J.
Oil City	Shialabba, Samuel C.
Old Forge	Grippi, Eugene A.
Old Forge	Marchese, Philip C.
Philadelphia	Arbogast, Jack G.
Philadelphia	Carson, Israel H.
Philadelphia	Drew, John A., Jr.
Philadelphia	Kresloff, Morris S.
Philadelphia	Krygier, Alfonse L.
Philadelphia	Pressman, Edward
Philadelphia	Rush, Samuel
Philadelphia	Sarubin, Sidney A.
Philadelphia	Shapiro, David
Philadelphia	Sherman, Robert
Philadelphia	Simkins, Leonard
Philadelphia	Tasca, Henri A.
Philadelphia	Udis, Lewis B.
Pittsburgh	Calvert, Dow D.
Pittsburgh	Fischer, Joseph C.
Pittsburgh	McDermott, Charles F.
Pittsburgh	McMahon, Thomas G., Jr.
Pittsburgh	Wisniewski, Casimir F.
Reading	Leddy, Cyril V.
Reading	Seigel, Nathaniel A.
Richland	Knoll, Harold E.
Ridgway	Downs, James R.
St. Marys	Glover, Harvey H.
State College	Lonberger, Daniel M.
Warren	Myers, Earle W.
Washington	Johnson, Robert M.
Waynesboro	Shockey, Donovan I.B.
Wilkinsburg	Elias, Merrill J.
York	Berkheimer, Ralph E.

Philippine Islands

Manila	Perry, Ellis R.

Puerto Rico

Caguas	Arenas, Jose V.
Ponce	Tormes, Leopoldo, Jr.
San German	Quinones, Artaldo V.
San Juan	Mercado, Jose A.
Santurce	Goenaga, Jose R.

Rhode Island

Central Falls	Sack, Mitchel
Cumberland	McLaughlin, Francis X.
Newport	Jaffe, Alfred
Providence	Brown, Edward
Providence	Dreyfuss, Jack B.
Providence	Genter, Charles
Providence	Goldberg, Norman I.
Providence	Nelson, Walter J.

Providence	Temple, Edward J.
Providence	Weinberg, Alex

South Carolina

Aiken	Molony, William W., Jr.
Charleston	Brawley, Harold S.
Charleston	Rosen, Jack
Greenwood	McLees, William G.

South Dakota

Parker	Decker, Rynold E.
Rapid City	Brown, Byron F.
Tyndall	Hoch, Lambert E.

Tennessee

Chattanooga	Burgess, Max P.
Chattanooga	Keith, Louis C.
Chattanooga	Moore, Millard B.
Chattanooga	Stack, William E.
Clinton	McGhee, Barton L.
Corryton	Idol, William R.
Edgemoor	Jones, James E.
Henderson	Jester, Luther M., Jr.
Huntingdon	Tidwell, Oscar C.
Kingsport	Martin, Horace C.
Knoxville	Ford, Russell O.
Knoxville	Stark, Charles L.
Maryville	Stanley, Thomas G.
Memphis	Baxter, Alva G.
Memphis	Kaminsky, Herman
Memphis	Levitch, Herman C.
Memphis	Mies, Charles A., Jr.
Memphis	Ramsey, Gordon B.
Memphis	Taylor, Eugene H.
Memphis	Woods, Robert I.
Nashville	Morris, James M.
Nashville	Roman, Daniel W.
Newport	Mullen, Albert M.
Paris	Jolley, William H.
Sevierville	Ingle, Ronald J.
Spring City	Strathern, Arthur D.

Texas

Abilene	Boyd, Fred A.
Archer City	Lyon, James A.
Austin	Wood, Wilton E.
Beaumont	Grimes, Howell W.
Breckenridge	Lane, Dick R.
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Dallas	Louwien, Wilfred H.
Dallas	Trad, George K.
Dallas	Wade, Wells M.
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Fort Stockton	Robertson, Earle A.
Fort Worth	Calkins, Russell F.
Goose Creek	Blum, Maurice
Grapeland	Guice, Al Bertous, Jr.
Handa	Meyer, John H.
Houston	Ewell, Costromer T.
Houston	Rogers, Talmage V.
Houston	Taylor, Judson L.
Houston	Waltrip, Maurice C.
Kilgore	Sherman, Byron C.
Lamesa	Lawson, Virgil L.
Longview	Mitchell, Rodney G.
Lubbock	Prohl, Carl J.
McLean	Finley, Charles W.
Mineral Well	Ivie, Rufus A.
Overton	Smith, Thurman G.
Plainville	Wehrheim, Francis W.
San Antonio	Thomas, Kenneth W.
Schulenburg	Meyer, Charles H.
Sherman	Bratton, Vernon W.
Taft	Wise, Millard D.
Teague	Irwin, Archie C.
Texas City	Grill, Benjamin F.
Victoria	Sitterle, James G.
Waco	Russell, Charles F.
Waco	Voight, Ott L.

Utah

Provo	Wallace, Harold G.
Salt Lake City	Sumnicht, Russell W.

Vermont

Burlington	Speas, Clarence J.
Middlebury	Lazarus, Herbert N.
Poultney	Sennett, Patrick A.

Virginia

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Altavista	Ware, Howard T.
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Fort Defiance	Spitzer, Alfred R.
Kecoughtan	Richards, Paul E.
Lexington	Simons, Robert L.
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Marion	Hess, Newton E.
Norfolk	James, Frederick W.
Norfolk	Wells, Frank L., Jr.
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Roanoke	Kaminester, Herbert M.
Roanoke	Saunders, Thomas D.
Rocky Mount	Rucker, James H.
Wytheville	Speer, Clyde V.

Washington

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Bellingham	Alexander, James P.
Chehalis	Kuhn, William K.
Colville	Ingle, John I.
Edmonds	Higgins, William A.
Harrington	Schultz, Edwin C.
Mt. Vernon	Morrill, Robert P.
Olympia	Matheson, John A.
Olympia	Thacker, William A.
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Seattle	Levy, Leon B.
Seattle	Nelson, Walter B.
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Racine	Jones, Guilbert K.	
Racine	Soref, Hyman J.	
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Thorp	McNown, William W.	
Waterford	Mucci, Spartaco, M.	
Watertown	Usher, John H.	
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Wauwatosa	Lookatch, William C.	
	Wyoming	
Casper	Germon, Albert F.	

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SEPARATED FROM NAVY DENTAL CORPS

THE following naval dental officers have been separated from service, according to lists received from the Navy Department. These lists are not complete. Other names will be published as soon as possible.

	Arizona	
Tucson	Tweed, Elizabeth A.	Lieut.
	Arkansas	
England	Hardin, Richard D.	Lieut.
	California	
Beverly Hills	Gordon, Robert C.	Cmdr.
Eureka	Parks, Clyde R.	Lt. Cmdr.
San Diego	Dittes, Robert M.	Cmdr.
San Francisco	Emmerson, J. H.	Lt. Cmdr.
	Connecticut	
Hartford	Wisniewski, Chester A.	Lieut.
	Florida	
Miami	Arnold, Edward H.	Lieut.
	Georgia	
College Park	Upshaw, Elbert M.	Lieut.
	Illinois	
Chicago	Stilley, John W. L.	Lieut.
Chicago	Wiesjahn, Howard W.	Lieut.
Joliet	Hutchinson, R. A.	Lieut.
Pana	Kamarit, Edward J.	Lieut.
Tinley Park	Wesselius, Richard E.	Lieut.
	Indiana	
Princeton	Hunley, John B.	Lieut.
Terre Haute	Davis, William E.	Lieut.
Wabash	Ebbinghouse, E. R.	Lieut.
	Iowa	
Dubuque	McKay, James M.	Lieut.
	Kansas	
Frontenac	Haderlein, Robert V.	Lieut.
Hays	Kuhn, Elmer J.	Lieut.
Holton	Gilbert, Doyle K.	Lt. Cmdr.
	Maine	
Smyrna Mills	Tarbell, Ira K.	Lieut.
	Massachusetts	
Great Barrington	Mullany, G. T., Jr.	Lieut.
Sharon	Murphy, Daniel J.	Lt. Cmdr.
	Minnesota	
Redwood Falls	Inglis, Stephen P.	Lt. Cmdr.
	Mississippi	
Meridian	Dawson, W. W.	Lt. Cmdr.
	Missouri	
Joplin	Smith, Cyrus D.	Lt. Cmdr.

DEATHS

Applewhite, James F., Monrovia, Calif.; School of Dentistry, Indiana University, 1909; died July 14.

Belyeu, W. S., Atlanta, Ga.; died July 3; aged 77.

Brett, Donald C., Parma, Idaho; College of Dentistry, State University of Iowa, 1891; died June 30; aged 80.

Bundren, Louise, New York; died May 31.

Calkins, Robert W., Perry, N. Y.; School of Dentistry, University of Buffalo, 1908; died July 12; aged 62.

Charles, Joseph R., Johnstown, N. Y.; Baltimore College of Dental Surgery, 1919; died July 7; aged 50.

Cook, L. J., Flat River, Mo.; School of Dentistry, St. Louis University, 1920; died June 28; aged 54.

Dillard, J. R., Montgomery, Ala.; Baltimore College of Dental Surgery, 1900; died July 20; aged 78.

Eckes, John D., Los Angeles; died July 11; aged 73.

Eidemiller, Aaron F., Toledo, Ohio; College of Dental Surgery, University of Michigan, 1914; died July 19; aged 55.

Eynon, Thomas A., Scranton, Pa.; Thomas W. Evans Museum and Dental Institute School of Dentistry, University of Pennsylvania, 1897; died July 19; aged 71.

Goldberg, Irving C., Chicago; died July 26; aged 39.

Graves, William S., Toledo, Ohio; American College of Dental Surgery, 1892; died July 6; aged 77.

Hamel, Earl S., St. Joseph, Mo.; died July 17; aged 64.

Harper, Fred E., Angola, N. Y.; School of Dentistry, University of Buffalo, 1903; died July 17; aged 66.

Howland, Harman, Warren, Ohio; College of Dentistry, Ohio Medical University, 1907; died July 20; aged 66.

Jensen, Vera W., Berkeley, Calif.; College of Dentistry, University of California, 1927; died July 6; aged 41.

Johnson, C. Arthur, Columbiana, Ohio; died June 27; aged 47.

Knapp, Le Roy A., Oak Park, Ill.; Dental School, Northwestern University, 1903; died July 25; aged 65.

Kratzer, Cyrus V., Palmyra, Pa.; Pennsylvania College of Dental Surgery, 1878; died July 29; aged 91.

Leiner, Frank, Downers Grove, Ill.; Chicago College of Dental Surgery, Dental Department of Loyola University, 1924; died July 13.

McEldowney, Hugh F., New Martinsville, W. Va.; Kansas City College of Dentistry, 1896; died July 4; aged 70.

Manley, J. Frank, Baltimore; School of Dentistry and the Baltimore College of Dental Surgery, University of Maryland, 1917; died June 25; aged 54.

Marks, Robert, New York; New York College of Dentistry, 1915; died July 24; aged 51.

Matthews, Archie D., Batesville, Ark.; School of Dentistry, Vanderbilt University, 1911; died August 4; aged 62.

Mauris, Joseph C., Grand Rapids, Mich.; died June 20; aged 47.

Metcalf, George R., Barnesville, Minn.; University of Minnesota, 1909; died August 2; aged 60.

Narins, George F., Great Neck, N. Y.; died in January.

Orr, Robert B., Minneapolis; Chicago College of Dental Surgery, 1902; died July 17; aged 66.

Parks, Robin E., Poughkeepsie, N. Y.; College of Dental and Oral Surgery of New York, 1917; died July 9.

Parsley, Fred, Tulsa, Okla.; Kansas City-Western Dental College, 1923; died June 29; aged 49.

Phelps, Charles E., Louisville, Ky.; died June 14; aged 42.

Phillips, W. S., McAlester, Okla.; died June 9.

Richards, Charles W., Phoenix, N. Y.; School of Dentistry, University of Buffalo, 1901; died July 19; aged 71.

Ryland, W. Harry, Meyersdale, Pa.; School of Dentistry, University of Pittsburgh, 1900; died July 20; aged 76.

Smith, Charles J., Providence, R. I.; Harvard University Dental School, 1915; died July 14; aged 54.

Teitelbaum, Norman, Newark, N. J.; School of Dentistry, University of Pittsburgh; died July 29; aged 23.

Thompson, Arthur N., Wauwatosa, Wis.; School of Dentistry, Marquette University, 1899; died July 26.

ANNOUNCEMENTS

MEETINGS OF STATE SOCIETIES

State	Date	Place	Secretary	Address
Alabama	April 8-10, 1947	Birmingham	G. W. Matthews	1922 Tenth Ave., South, Birmingham 5
Arizona			R. D. McDonald	601 Valley Bk. Bldg., Mesa
Arkansas			I. M. Sternberg	Merchants Bk. Bldg., Ft. Smith
California			L. E. Linehan	450 Sutter, San Francisco
S. California			R. L. Borland	Rm. 615, 1052 W. Sixth St., Los Angeles
Colorado			M. R. Markley	Republic Bldg., Denver
Connecticut			E. S. Arnold	37 Linnard Rd., W. Hartford
Delaware			R. H. Stucklen	1003 Delaware Ave., Wilmington
D. of Columbia			M. E. Colvin	1726 21st St., N.W., Washington
Florida	Nov. 11-13	Palm Beach	A. J. Fillastre	603 Marble Arcade, Lakeland
Georgia			R. H. Murphy	605 Bankers Ins. Bldg., Macon
Hawaii	Oct. 29-Nov. 3	Honolulu	J. H. Dawe	P. O. Box 39, Honolulu
Idaho			H. Miller	Moscow
Illinois			L. H. Jacob	Jefferson Bldg., Peoria
Indiana			E. E. Ewbank	Kingman
Iowa	May 6-8, 1947	Des Moines	A. N. Humiston	417 Higley Bldg., Cedar Rapids
Kansas	May 12-15, 1947	Kansas City, Mo.	F. A. Richmond	1008 Huron Bldg., Kansas City
Kentucky			J. L. Walker	640 Barbee Way S., Louisville
Louisiana	April 10-12, 1947	New Orleans	J. S. Bernhard	407 Med. Arts Bldg., Shreveport
Maine			A. H. Garcelon	State House, Augusta
Maryland			P. A. Deems	835 Park Ave., Baltimore
Massachusetts	May 5-8, 1947	Boston	P. E. Adams	106 Marlborough St., Boston
Michigan			F. Wertheimer	Mich. Dept. of Health, Lansing
Minnesota	Feb. 24-26, 1947	Minneapolis	L. M. Cruttenden	498 Lowry Med. Arts Bldg., St. Paul
Mississippi			O. L. Colee	Magnolia
Missouri	May 12-15, 1947	Kansas City	C. W. Digges	Exchange Natl. Bk. Bldg., Columbia
Montana			F. E. Laing	401 Hart-Albin Bldg., Billings
Nebraska			F. A. Pierson	Fed. Securities Bldg., Lincoln
Nevada			L. G. Jacob	601 Med. Dent. Bldg., Reno
New Hampshire			F. E. Williams	814 Elm St., Manchester
New Jersey			J. G. Carr	223 E. Hanover St., Trenton
New Mexico			J. S. Eilar	First Natl. Bk. Bldg., Albuquerque
New York			C. A. Wilkie	1 Hanson Place, Brooklyn
North Carolina			C. W. Sanders	Benson
North Dakota			F. A. Maides	Grand Forks
Ohio	Nov. 11-13	Columbus	E. C. Mills	220 S. Cassady Ave., Columbus
Oklahoma			E. Wise	Med. Arts Bldg., Tulsa
Oregon			W. H. Hurley	Selling Bldg., Portland
Panama Canal Z.			I. Buchin	Post Dent. Surgeon, APO 834, c/o PM, New Orleans
Pennsylvania	May 6-8, 1947	Philadelphia	E. R. Aston	421 Market St., Kingston
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Puerto Rico			J. O. Porrate	16 Caribe, Santurce
Rhode Island			C. F. McKivergan	102 Waterman St., Providence
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South Dakota			E. W. Elmen	Sioux Falls
Tennessee	May 12-15, 1947	Nashville	E. J. Justis	Exchange Bldg., Memphis

Texas	April 28-30, May 1, 1947	San Antonio	W. Ogle	313 Med. Arts Bldg., Dallas
Utah			M. G. Kuhre	Trib.-Tel. Bldg., Salt Lake City
Vermont			J. A. Larrow	Middlebury
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West Virginia			G. J. Gavelda	Clarksburg
Wisconsin	March 31, April 1-2, 1947	Milwaukee	K. F. Crane	1233 Bankers Bldg., Milwaukee 2
Wyoming			J. D. McNiff	Laramie

MEETINGS OF STATE BOARDS OF DENTAL EXAMINERS

State	*Date*	*Place*	*Secretary*	*Address*
Arizona	Oct. 2	Phoenix	R. K. Trueblood	25 N. Second Ave., Glendale
Florida	Oct. 28-31	Jacksonville	A. W. Kellner	P.O. Box 155, Hollywood
Kentucky	Dec. 17-20	Louisville	W. F. Walz	1114 1st Natl. Bk. Bldg., Lexington
New Jersey	Dec. 9-13		W. A. Wilson	150 E. State St., Trenton
Oregon	Oct. 28-Nov. 2	Portland	F. L. Utter	506 Pioneer Trust Bldg., Salem
Pennsylvania	Feb. 17-22,* 1947	Philadelphia	R. E. V. Miller	61 N. Third St., Easton
Tennessee	Jan. 20-24, 1947	Memphis	J. J. Vaughn	1005 Medical Arts Bldg., Nashville 3
Texas	Oct. 20-25	Dallas	C. C. Hardin, Jr.	311 Norwood Bldg., Austin 16
Wisconsin	Feb. 10-14, 1947	Milwaukee	S. F. Donovan	Tomah

*Feb. 17-19 written (dental); Feb. 18-19 written (hygienists); Feb. 20-22 clinical (dental); Feb. 20 clinical (hygienists).

OTHER MEETINGS

Name	*Date*	*City*	*Secy. or Chm.*	*Address*
American Academy of Periodontology	Oct. 17-19	Birmingham	R. E. Johnson Secy.	824 Lowry Med. Arts Bldg., St. Paul 2
American Association of Dental Examiners	Oct. 12-13	Miami	C. A. Bumstead Secy.	924 Stuart Bldg., Lincoln, Nebr.
American Dental Assistants Association	Oct. 14-16	Miami Beach	Aileen Ferguson Secy.	709 Centre St., Jamaica Plain 30, Mass.
American Dental Association	Oct. 14-16	Miami	H. B. Pinney Secy.	222 E. Superior St., Chicago
American Dental Hygienists' Association	Oct. 14-16	Miami Beach	A. R. Fisk Secy.	1704 N. Troy St., Arlington, Va.
American Public Health Association	Nov. 11-16	Cleveland	H. J. Knapp Chm.	Health Commissioner, Cleveland
American Society for the Advancement of Science	Oct. 28	New York	M. Hillel Feldman Secy.	730 Fifth Ave., New York 19
American Society of Oral Surgeons	Oct. 9-12	Miami Beach	Harry Bear Secy.	1112 E. Clay St., Richmond 19, Va.
Montreal Dental Club	Oct. 23-25	Montreal	M. L. Donigan Chm.	Drummond Med. Bldg., 1414 Drummond St., Montreal
Chicago Dental Society	Feb. 10-13, 1947	Chicago	L. R. Hegland Ex. Secy.	30 N. Michigan Ave., Chicago
Detroit District Dental Society	Nov. 4-5	Detroit	F. E. Fleming Chm.	4421 Woodward Ave., Detroit 1
Association of Military Surgeons of the United States	Oct. 9-11	Detroit	Col. B. R. Shurly Chm.	1005 Stroh Bldg., Detroit 26
Mid-Continent Dental Congress	Nov. 4-6	St. Louis	E. C. Brooks Chm.	4500 Olive St., St. Louis
St. Louis University, Alumni Association	Nov. 22-23	St. Louis	O. J. Dick	1657 S. Grand Blvd., St. Louis
University of Buffalo, School of Dentistry, Alumni Association	Oct. 8-10	Buffalo	E. L. Ruffing Publicity Chm.	233 W. Ferry St., Buffalo
Dental Hygienists Association of the City of New York	Oct. 4	New York	Evelyn Jaeffa Publicity Chm.	20 Pomander Walk, New York
New York Society of Orthodontists	Nov. 4-5	New York	O. Jacobson Secy.	35 W. 81st St., New York

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THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION
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